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Implementation of a Simulation-based Interprofessional Patient Safety Program

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Abstract

Problem: Despite mandatory biannual patient-safety training at hospitals in Japan, medical adverse events continue to increase. However, many such events are preventable through adherence to standard practices of safe patient care.

Context: A lecture-based educational approach is inadequate to develop patient-safety competency in clinical educators or clinicians. Participation in simulation-based interprofessional patient-safety training programs can enhance knowledge, skills, and attitudes to promote patient safety culture and enhance patient outcomes.

Interventions: An evidence-based train-the trainer-patient safety program was conducted using simulation for interprofessional healthcare educators to serve as safety champions.

Measures: Three outcome and three process measures geared toward self-evaluation and reflection were used to assess achievement of specific aims.

Results: Seventy-seven percent of participants completed the program. Eighty nine percent conducted their own patient-safety training sessions within six months. Participants reported their levels of satisfaction with knowledge, skills, and confidence gained at 85% of higher.

Conclusion: Simulation-based patient safety training for interprofessional healthcare educators has the potential to bridge the gap between the lack of patient safety education and clinical practices necessary to reduce patient adverse events during hospitalization.

Keywords: interprofessional, patient safety, safety champion, simulation-based education, train-the-trainer

Section II. Introduction

Patient harm during hospital stays is now the 14th leading cause of morbidity and mortality worldwide (World Health Organization [WHO], 2018). In the United States, hospital and outpatient medical error has been implicated in 9.5% of all deaths, elevating it to the third leading cause of death, behind heart disease and cancer (Johns Hopkins University, 2016). However, adherence to ordinary standards of professional competency and safe patient care could prevent at least half of these adverse events (Brasaite, Kaunonen, & Suominen, 2015). Simulation-based healthcare provider education on safe patient care offers an alternative to the limitations of lecture and clinic-based training for professionals in hospital-based practice (Lane & Mitchell, 2013) and has a role to play in reducing patient harm (Motola, Devine, Chung, Sullivan, & Issenberg, 2013).

Problem Description

The Japanese Ministry of Health (2006) instituted mandatory, twice-yearly patient safety training at individual hospitals starting in 2007. Despite this requirement, medical adverse events documented through mandatory hospital reporting increased from 1,266 in 2007 to 3,428 in 2016, a 170% increase (Japan Council for Quality Health Care [JQ], 2017). In Japan, medication errors are a common source of these medical adverse events, compromising patient safety and creating large financial burdens for healthcare institutions (Kohn, Corrigan, & Donaldson, 2000; Cloete, 2015).

According to data for 2016 on adverse events in hospitals in Japan (JQ, 2017), 8.7% of inpatients died from medical errors and 10.3% of patients experienced serious impairment. The JQ report attributed 37% of adverse events to nursing care, followed by treatment/procedures at 30%. Half of these events were not attributed to lack of competency or training in professional

skills, but due to neglect to check, failure to observe, and misjudgment resulting in an inappropriate decision (JQ, 2017).

The healthcare education system in Japan lacks a framework to establish and ensure core competencies in patient safety for healthcare providers. Although Japanese medical and nursing schools have integrated some patient safety education in their curricula, the entire patient safety curriculum is less than five hours and is delivered by traditional lectures (Kamishiraki, Starkey & Maeda, 2012; Starkey, Kamishiraki, Ehara, & Maeda 2011). Hospital-based safety training for healthcare providers is also lecture-based and inadequate to develop patient safety competency (Yamaguchi et al., 2018). Although a lecture-based approach can increase knowledge, successful transfer of that knowledge to clinical practice does not necessarily occur, and "seat time" of training is not an appropriate measure to substantiate acquisition of competency (Zigmont, Kappus, & Sudikoff, 2011). Waxman (2010) has made the case that traditional teaching methods, encompassing lecture, discussion, role-play, and laboratory practice, may no longer suffice as a pedagogical approach to achieve the employing organization's patient safety goals. Additionally, nurses and physicians in hospital-based practice face personnel and institutional barriers such as workload, staff shortages, and time constraints, that make it difficult for them to engage in training needed to develop patient safety competency (Lane & Mitchell, 2013).

The ability to collaborate with other professionals is necessary to ensure the quality of care and address patient safety. In order to improve collaborative behavior, interprofessional education needs to be implemented (Onishi, Komi & Kanda, 2013). Enhanced interprofessional collaboration fostered by interprofessional education (IPE) is beneficial for health system outcomes such as enhanced quality of care, increased patient safety and reduced cost (IOM, 2003). Japanese healthcare professionals' attitudes toward physician-nurse collaboration

specifically, and collaborative practice, in general, were not positive due to physicians' higher authority and nurses' lower autonomy, especially from the physicians' perspectives (Onishi et al., 2013). This finding points to the need to encourage more positive attitudes toward collaborative practice through continuing professional education. Positive attitudes toward interprofessional collaboration is associated with increased job satisfaction and may reduce turnover (Galletta, Prtoghese, Carta, D'Aloja, & Campagna, 2016).

Available Knowledge

PICO(T) question. For international multi-professional clinical educators at hospitals in Japan, how does implementation of a simulation-based patient safety train-the-trainer program, as compared to the traditional lecture-based patient safety training program, impact facilitation of on-site patient safety training (measured at six-months post-intervention) and the clinical educator's patient safety attitude (measured at four points: pre-intervention, immediate post-intervention, three months post-intervention, and six months post-intervention)?

***Search methodology*.** A systematic search was conducted using the following databases: Cochrane, Evidence-Based Journals, CINAHL, PubMed, and AHRQ Evidence Reports in English and Japanese for articles published between January 2008 and February 2018. The search focused on patient safety issues in Japan, simulation-based patient safety training for educators, strategies to improve patient safety and quality in-hospital setting. Search terms used were *patient safety, safety champions, simulat*, interprofessional, train-the-trainer model, faculty development.* The initial search using the key terms *patient safety*, *simulat**, and *train-the-trainer* returned zero articles. A subsequent search using other combinations of key terms—*patient safety, simulat* and interprofessional*—returned 69 articles. However, the articles did not include relevant studies and/or program evaluation sufficient to answer the PICOT question.

Therefore, a direct, targeted search of simulation and safety journals was conducted, which returned 11 articles that included systematic reviews needed to address the PICOT question.

Review of the evidence. The *Johns Hopkins Evidence Appraisal Tools* (Dang & Dearholt, 2018) was used to examine the level of evidence for each article. The evaluating table and evidence synthesis table are provided in Appendix A.

Simulation-based patient safety program. Cook et al. (2011) conducted a systematic review and meta-analysis, in which they found a consistent positive relationship between simulation-based training for health professionals and large, positive effects when knowledge, skills, and behaviors were evaluated and moderate effects when patient-related outcomes were evaluated. Interventions that employed a mastery learning model, in which learners proceed to the next level only after achieving a defined benchmark, were associated with higher outcomes than other interventions. The authors found an association between improved outcomes and simulation-based training across various clinical topics, including large effects on clinician behaviors and moderate effects on patient care. Moreover, the authors presented evidence increased team cooperation and communication, critical decision making, and improved patient care skills when practitioners engaged in SBE.

Hegland, Aarlie, Strømme, & Jamtvedt (2017) initiated a systematic review and meta-analysis to evaluate the effects of simulation-based training on nurses' skills and knowledge, comparing simulation-based training to other training methodologies. They found simulation-based training to have a greater effect on nurses' skill improvement when compared to other training approaches. From this review and analysis, the authors asserted the importance of quality improvement in healthcare to increase patient safety and included simulation-based training a quality-improvement strategy for healthcare.

Gordon, Fell, Box, Farrell and Stewart (2017) conducted a qualitative study to identify how the context of interprofessional simulation-based training influences acquisition of non-technical skills acquisition and development of safety behavior. The authors found that interprofessional learner groups that had received simulation-based training had increased non-technical skills useful in mitigating intergroup barriers. The authors suggested the need for future investigation of the role of intergroup barriers as contributors to error-promoting behavior within a healthcare setting and the relationship of non-technical skills training to behavioral change and improved patient safety outcomes.

A systematic review was conducted by Schmidt, Goldhaber-Fiebert, Ho, and McDonald (2013) to examine evidence of the effects of simulation-based education on patient safety outcomes. Studies included in the review demonstrated that simulation-based training improved team performance and enhanced interpersonal collaboration. Limited evidence suggested improvements in patient outcomes were attributable to simulation-based training in healthcare systems. The authors suggested a need for future studies to utilize standardized reporting of simulation components and consistent identification desired patient safety outcomes.

Blackmore, Kasfiki, and Purva (2017) conducted a systematic review to evaluate simulation-based education (SBE) specifically in relation to human factors, including communication, and its impact on patient outcomes. The studies included in the review suggest that simulation is an effective tool for team training focused on human factors and when put into practice in healthcare, can have a positive impact on patient outcomes.

Motola, Devine, Chung, Sullivan, and Issenberg (2013) selectively reviewed best practices from *Best Evidence Medical Education Systematic Review* (Issenberg, McGaghie, Petrusa, Gordon, & Scalese, 2005) and provided case studies and expert opinion in an evidence-

based guide for effective use of simulation in healthcare for educators. Motola et al. examined how to use simulation most effectively to achieve educational, clinical & patient outcomes. Reviewed topics were curriculum integration, feedback/debrief, deliberate practice, mastery learning, the range of difficulty, clinical variation, individualized learning, team training, and simulation-based education in the future. Each topic in the guide describes definition, background, implementation for practice and common challenges educators experience. The authors cited simulation-based education as part of the solution in reducing medical errors and enhancing patient safety in support of the healthcare educational goal to advance healthcare provider's competency and provide the safest care to their patients. Healthcare educators are trying to develop successful educational programs for healthcare professionals with educational outcomes that are retained and practiced. Through their work, the authors are identifying the most promising to educate healthcare providers using simulation in healthcare education. The authors concluded that in order to enhance clinical and patient outcomes, providing evidence-based, best practices in simulation-based healthcare education is necessary.

Simulation recreates the clinical environment, providing an authentic way to address safety interventions, assess safety, and understand why errors occur (Weinger & Gaba, 2014). SBE translation science "demonstrates that results achieved in the educational lab transfer to improved downstream patient care practices and improved patient and public health" (McGaghie, Draycott, Dunn, Lopez, & Stefanidis, 2011, p. 6). In order to enhance clinical and patient outcomes, providing evidence-based, best practices in SBE is necessary (Motola et al., 2013).

Train-the-trainer program. Ahmed et al. (2013) developed a patient safety training for senior physicians to become patient safety faculty leaders. A half-day program was implemented

to 216 senior physician faculty volunteers who expressed an interest in patient safety. The program content consisted of patient safety theory, root cause analysis, and small group facilitation. The participant's knowledge, skills, and attitudes in patient safety were evaluated in pre, post and eight months after program completion. All their knowledge, skills, and attitudes were significantly improved immediately post-training. These improvements persisted at eight months post-completion. After they completed the program, 72% of participants conducted 'lessons learned' sessions to apply their learning as a facilitator between January 2011 and July 2012. The participants reported that the challenge was to find time to conduct the sessions on top of their clinical commitments. Overall, the training program was delivered successfully, first to the physician volunteers as learners, and subsequently as facilitators in a safety train-the-trainer session. The authors concluded that the train-the-trainer program carried out in the study was effective in delivering patient safety training in a clinical setting.

Lane and Mitchell (2013) developed simulation champions using the train-the-trainer program in an undergraduate nursing program. Their results led them to conclude that a train-the-trainer model is an effective method to develop knowledge and skills as an educator. A three-step train-the-trainer model was used. First, they identified six faculty members to serve as clinical simulation champions. Second, all six-faculty completed online Simulation Innovation Resource Center (SIRC) modules. Third, they participated in simulation champion roles in an offsite retreat. After the retreat, the six simulation champions incorporated simulation curricula into the undergraduate nursing program and facilitated training for other educators. Both formative and summative evaluations were done for each step of the model: (a) identify who is interested in becoming a champion, (b) develop and implement a simulation-based education, and (c) integrate the champions to be simulation facilitators. The authors concluded that using

this three-step train-the-trainer model to develop a core simulation champion can be effective in preparing nursing educators. These champions can then mentor and educate other faculty or healthcare educators in the organization. The authors suggested that this model is effective for use in other topic areas. The literature review supported using simulation-based education as a tool to teach patient safety. Moreover, the train-the-trainer model can be a cost-efficient and effective method for educators as safety champions to develop positive attitudes toward collaboration to improve patient safety.

Rationale

Conceptual framework. The conceptual framework used for this project was a combination of adult learning theory (Knowles, 1970) and the Kirkpatrick evaluation model (1994). Both are widely used in healthcare professional development and guided the design, implementation, and evaluation of the simulation-based patient safety program. This conceptual framework supported an effective educational outcome for this project.

Adult learning theory. Adult learning theory was proposed by Malcolm Knowles in 1968. His assumption was that adults learn differently than children. He identified six characteristics of adult learners: 1) self-directed, 2) accumulated experience, 3) readiness to learn, 4) practicality, 5) motivation to learn and 6) reason (Knowles, 1970 & 1978).

Knowles suggested that based on these six characteristics, there are seven principles to consider when teaching adult learners: 1) adult learners need to be involved in the process of their learning; 2) the learners' experience should be included in their learning; 3) the content should be relevant to the learners' life or work; 4) the learning should be problem-centered instead of memorizing and content-centered; 5) adults learn better through active practice and

participation; 6) adult learners need to be shown respect from others; and 7) an informal learning environment works better for adult learners.

Knowles adult learning concepts and principles have been widely used in academic settings, including e-learning, as well as in business and healthcare for professional development. The depth of experience that adult learners have acquired makes them a valuable resource for others (Knowles, 1978). The more educators understand the concepts and principles of adult learning theory, the more effective adult educational practices can be (Merriam, Caffarella, & Baumgartner, 2012). By putting these principles into practice, learners increase engagement with their organizations in matters such as safety, reinforcing the lessons learned and contributing to the outcomes for which the training was designed (Galbraith & Fouch, 2007). Adult learning theory fits simulation-based education and a train-the-trainer model because adults learn better when the contents are relevant to the learner, involves active participation, and can be put into practice.

Kirkpatrick's evaluation model. The Kirkpatrick evaluation model was founded by Donald Kirkpatrick in 1959. This evaluation model has four levels: reaction, learning, behavior, and results. Reaction measures how participants react to the training, such as their satisfaction. Learning assesses whether the learners acquire knowledge and skills from the training. Behavior assesses whether the learners use the knowledge and skills they learned and applied on the job. Finally, results measure the impact on the organization from the training (Kirkpatrick, 1994). This model presents basic evaluation goals at each level, indicates whether the program was effective, and identifies how the training program could be improved. This framework is applicable for 1) evaluating how learning acquired in simulation-based training impacts the

safety attitudes of the participants and 2) determining whether the participants apply their changed attitudes as safety champions at their worksites.

Specific Aim

The objective of this project was to conduct and evaluate a simulation-based interprofessional patient safety training to prepare clinical educators to become patient safety champions and implement their own simulation-based patient safety training programs.

- The target was for 70% or more of participants to conduct a simulation-based patient safety training session at their own institution by six months post intervention.
- The target for individual learners was for 80% or more of participants to self-assess their competencies as patient safety educators at a level of 4 or 5 on a five-point scale after completing the intervention.
- The target for individual safety attitude change was a 10% or greater increase in the mean value for each category of the Safety Attitude Questionnaire (SAQ) from pre to six months post intervention.

Section III. Methods

Context

This project was a collaboration of the academic simulation center of a U.S. school of medicine and two academic simulation centers in Japan. The DNP candidate chose the project based on three needs assessments from prior simulation-based faculty development programs conducted by the DNP candidate in collaboration with faculty jointly teaching at the U.S. school of medicine and schools of medicine or academic medical centers in Japan.

Identification of the key stakeholders, characterization of their interests and priorities, and fostering their support was crucial to the success of this project. The key stakeholders were

the director of the U.S. healthcare simulation center; the simulation center's program developer and faculty members who served as training facilitators; a nursing faculty who is an expert in patient safety and instructional design; and the participants (clinical educators on staff at hospitals in Japan) in the simulation-based education programs. These stakeholders recognized the need for change in patient safety training at hospitals in Japan.

Although many clinical educators who train frontline healthcare providers have a strong sense of the need to change from lecture-based to competency-based patient safety training, few feel equipped to direct or undertake the change themselves (Y. Moritoki, personal communication, June 26, 2018). Thus, the first step in instituting the desired change in patient safety training was to provide opportunities for clinical educators to participate in a training program to enhance knowledge, skills, and attitudes necessary for promoting a patient safety culture to enhance patient outcomes.

Intervention

The DNP candidate recruited hospital healthcare educators interested in undertaking a patient safety training program. The target population was multi-professional clinical educators on staff at hospitals in Japan. Each hospital has its own specific requirements to be a clinical educator/preceptor. Typically, five or more years of clinical experience and completion of preceptor training are required. In some cases, currently teaching at an academic institution as a clinical faculty can substitute for other requirements (C. Kawahara, personal communication, August 30, 2018).

The eligibility criteria for trainees in the DNP project were; currently practicing any healthcare specialty; ability to facilitate a patient safety program at their worksite; commitment to becoming a safety champion; and clinical teaching experience. Temporary staff such as

contract nurses or physicians were ineligible. For the purposes of this DNP project, the following definitions apply. “Program” covers the involvement of participants, from the initial sign-up through a participant-taught, on-premises safety training course conducted within six months of the one-day workshop and follow up via a self-assessment questionnaire. “Intervention” refers to the one-day training workshop, including the prebriefing, sessions and scenarios, debriefing, and questionnaires or surveys administered during this time. “Safety champion” refers to a participant who completed the intervention and completed an on-premises, simulation-based training within six months.

The intervention was offered twice in Japan, with 23 and 24 participants attending. The sessions were conducted in Japanese. All content and materials were developed in English and translated to Japanese by the DNP candidate, whose first language is Japanese. Prior to the intervention, participants completed an online anonymous questionnaire to provide demographic data, previous patient safety training and experiences relevant to the program, self-assessment of perceived deficiencies and learning needs in patient safety, and previous simulation learning or teaching experiences (see Appendix B).

The intervention, based on a six-step approach (Kern, Thomas, & Hughes, 2009) was developed by the DNP candidate, a Certified Healthcare Simulation Educator (CHSE). The training was conducted by the DNP candidate, one U.S. physician faculty, one Japanese physician faculty, one Japanese nursing and one Japanese pharmacy faculty, all trained in patient safety and simulation as educators. Multi-professional perspectives of trainers enabled participating clinicians to appreciate the strengths that various professions have to offer (George & Quatrara, 2018).

The simulation-based interprofessional patient safety training was a one-day workshop. The training approach was a combination of didactic, small group work, and group discussion. Fundamental methods of simulation-based instruction were used to provide course content. The content consisted of a) introduction to patient safety, b) rationale for simulation and application for patient safety, c) basic facilitation and debriefing techniques and learner assessment, d) interprofessional communication, e) trainee demonstration and discussion on utilizing simulation for interprofessional and patient safety training, and f) developing a plan for safety training based on the Joint Commission International (JCI) patient safety goals (JCI, 2017). The workshop agenda is presented in Appendix C.

Uramatsu et al. (2017) have linked the occurrence of accidental medical fatalities in Japan to lack of competencies in skills such as situation awareness, communication, and teamwork. Noguchi, Sakuma, Ohta, Bates, and Morimoto, (2016) in a review of medication errors reported by three teaching hospitals in Japan, found that two-thirds of the errors occurred at the ordering stage by physicians. This evidence influenced the development of two short training scenarios, one on situational awareness and the other on medication error communication.

In the situational awareness scenario, the participants' task was to identify several safety issues in a patient's room and address them as a group within a few minutes. In the medication error communication scenario, a pharmacist and a nurse retrieved and shared critical patient information, followed by the nurse using the two-challenge rule with a physician to resolve the medication error. Scenario descriptions are presented in Appendix D.

Facilitators conducted an orientation prior to each scenario. The orientation was a critical component in a simulation as it provides the opportunity for facilitators to explain the objectives,

rules, procedures, and equipment use, thus affecting learner success on the scenario. After each scenario, there was a debriefing. A facilitator led a discussion on how to apply these scenarios in a clinical setting, and how to modify these scenarios for use as an educator. Additionally, there were discussions related to the role and responsibilities of patient safety champions and potential challenges that participants might face when they teach at their own units or departments.

Fifteen minutes was scheduled at the end of the workshop for participants to take an online program evaluation, including questions on the simulation effectiveness tool. In order to engage in their role upon completion of the training, the new safety champions conducted a session for the clinical staff in their units within six months. Follow up videoconferences, led by the original facilitators, were held at three and six months after completion of the intervention to support the safety champions. During these videoconferences, the former participants reflected on the sessions they taught to clinical staff. Topics covered in the videoconferences included participants' successes, challenges, and areas for improvement. Self-assessment and SAQ were administered at three-months post completion. At six months after program completion, the self-assessment and SAQ, plus a total program evaluation were administered. This evaluation gauged retention immediately upon completion of a training session given by the new safety champions at their worksites. Additionally, the clinical participants in these sessions completed a program evaluation which was collected for project data and shared with the safety champion for self-improvement.

Gap analysis. There are major gaps between the current patient safety education practice and the optimal practice (see Appendix E). The current practice is primarily lecture-based safety training (Yamaguchi et al., 2018). Under current practice, Japanese healthcare professionals' attitudes toward physician-nurse collaboration are not positive (Onishi, Komi, & Kanda, 2013).

Additionally, under current practice, healthcare educators who take a simulation faculty development course, rarely have opportunities to teach or have support as a facilitator when they return to their worksites due to time constraints and absence of faculty who have competency in simulation education (Akamine, Berg, Nowicki, Ouchi, and Abe, 2015).

Gantt chart. The timeline and critical milestones for this project are on the Gantt chart (see Appendix F). From the initial planning phase to project completion, which includes the final DNP project submission, took 14 months. Preparing the contents of the program took approximately three months. The intervention was one day and conducted on two different days in January 2019. Data collection for the needs assessment started at program registration and continued through pre-intervention, immediate post-intervention, and three- and six-months post-intervention. Data was analyzed over the course of two months.

PDSA cycle. As a tool to ensure continuous quality improvement, a Plan, Do, Study, Act (PDSA) cycle (IHI, 2008) was implemented during development of the intervention and the simulation scenarios (see Appendix G).

Work breakdown structure (WBS). Major tasks were divided into four categories; planning, content, intervention/session, and evaluation/follow up (see Appendix H).

The planning stage included identifying the purpose of the program, determining the location and the dates, targeting participants, identifying the gap between current practice and desired practice, and deciding the number of facilitators based on the number of target participants and their occupations and program contents. Also included in the planning stage were determining the program budget, setting the project timeline, promoting the program, developing questionnaires for the needs assessment and participant demographics, and uploading the questionnaires and pre-course online materials. The content stage included evidence review,

needs assessment, setting goals and objectives, developing instructional methods, agenda, scenarios, pre-course e-learning materials, orientation/facilitation plan, scenario alpha and beta test, and course materials. The intervention stage began with the orientation, included survey and assessment tools, and the components of the intervention, followed by a debriefing. Evaluation and follow up began with setting a schedule, and included program evaluation, self-assessment, follow-up and three and six months, and data collection and analysis.

SWOT analysis. A SWOT analysis was conducted to identify internal strengths, weaknesses, external opportunities, and threats (see Appendix I). An internal strength was professional and institutional standing: three out of five facilitators are Certified Healthcare Simulation Educators (CHSE); the academic simulation center is accredited by the Society of Simulation in Healthcare (SSH). A second internal strength was that the program was to be conducted by multi-professional facilitators (physicians, nurses, and pharmacists) who have strong simulation educational, patient safety background and teaching experience. An external opportunity was that interprofessional simulation-based patient safety programs for clinical educators are not offered in Japan. In addition, since simulation-based healthcare education resources are very limited in Japan, there is a great opportunity to collaborate with other simulation centers and hospitals.

The internal weaknesses were a space limitation and a limited number of simulation facilitators, thus limiting the maximum participation to not more than 24 participants at each location. Due to the small number of participants, revenue from program fees would make it challenging to cover the fees and travel expenses for facilitators. A minimum of four facilitators are needed for a 24-participant program, a high facilitator to learner ratio which makes running the program expensive. An additional internal weakness was the lack of financial support for

participants, necessitating that participants fund their own education and expenses. From a financial perspective, an internal weakness was the lack of available data from Japan on the cost of medical adverse events or savings from safety improvements.

External threats included educators' perception that a one-day program fee $273/ ¥30,000 (yen) is expensive for a professional educational program. Although some healthcare educators are supported program fee by their employer, it is affected by the recruiting process, making it more difficult to attract participants, requiring an intensified recruiting process.

Project budget. The total expenses for this project were $12,456; ¥1,370,184 (see Appendix J). A one-day program was offered twice, once each in Osaka and Nagoya, Japan. The program fee for each participant was $273 (¥30,000), a total of $12,831 (¥1,410,000) was collected. The major expenses for this project were facilitator's fee at $6,000 (¥660,000), followed by travel expenses at $2,893 (¥318,256). Program supplies, participants' lunches, and administrative fees were $2,363 (¥259,928). The DNP candidate's facilitator's fee $727.30 (¥80,000) was waived. Fortunately, most travel expenses of the U.S. physician faculty, approximately $2,500 (¥282,500), were covered by a different project.

Return of investment (ROI). The ROI for the simulation-based safety training program supports the findings of Vogus, Cooil, Sitterding and Everett (2015) that the financial aspect is an important consideration in developing and implementing safety education and training. The financial focus of the DNP project was risk mitigation (measured as cost avoidance), which required some assumptions related to frequency and cost of errors and choice of appropriate indicators. For this project, medication error and RN turnover served as the basis for ROI calculations as medication error and RN turnover have been shown to reflect the overall

occurrence of medical errors and adverse events during hospitalization (Kato et al., 2017; Wijdenes, Badger, & Sheppard, 2019).

The workshop fee $273 (¥ 30,000) was largely covered by the participants' employers. The basis for the ROI calculations are as follows: the facilitator's fee was calculated based on hourly rate for public university employees by the Ministry of Health, Labor and Welfare in Japan (2015); the U.S. physician's fee is calculated from U.S. Bureau of Labor Statistics (2019) data for average hourly physician rates; travel costs are estimated from 2018 commercial rates for airline travel, accommodations, and meals.

Cost avoidance and ROI for medication errors. Cost avoidance calculations were based on the findings of Morimoto et al., (2010) of 1,350 annual occurrences of medication errors and adverse drug events in a large teaching hospital in Japan. Cost avoidance was calculated on medication error and RN turnover rate. The calculation for medication error is C x N - E = CA, where C is the cost per medication error, N is the number by which errors were reduced, E is program expense, and CA is cost avoidance. The figure used for cost per medication error is $15,954; ¥ 1,754,940 (Kato et al., 2017). Cost per medication error is the average cost of an adverse event; indirect costs and legal settlements are not included. Cost avoidance and ROI for medication error are presented in Appendix K. The cost avoidance for a one percent reduction in medication errors (12 errors) is $182,134 (¥ 20,034,740); five percent reduction (60 errors) is $947, 926 (¥104,271,860); and 10% reduction (120 errors) is $1,905,166 (¥209,568,260). The ROI for one percent, five percent, and 10% reduction in medication errors is 19%, 101%, and 203%, respectively.

Cost avoidance and ROI for RN turnover. The Japanese Nursing Association (2018), estimated 1,000,000 RNs are actively working in 8,400 hospitals in Japan at an 11% annual RN

turnover rate. Estimating a total cost to an organization of $224,000; ¥24,640,000 annually. RN turnover cost is calculated using a similar formula (R x N - C = CA, where R is nurse compensation, and N is the turnover number in a year, and C is the cost per RN turnover. The figure used for cost of one RN turnover is $16,000; ¥1,760,000 (Tominaga & Nishimura, 2015). Cost avoidance and ROI for RN turnover are presented in Appendix L.

The cost avoidance for a 10% reduction in RN turnover (12 turnovers) saves $182,686 (¥20,095,460); 15% reduction (18 turnovers) saves $278,686 (¥30,655,460); and 20% reduction (24 turnovers) saves $374,686 (¥41,215,460). The ROI for 10%, 15%, and 20% reduction in RN turnover is 19%, 29%, and 39% respectively.

Communication plan/responsibility matrix. The communication plan/matrix is located in Appendix M. The DNP candidate was responsible for almost all of the tasks of this project and took the lead for communication. However, a facilitator at each simulation center intervention site in Japan coordinated and managed administrative matters. The project team had videoconferences weekly or biweekly as needed to discuss roles and tasks to make sure everyone was clear about what needed to be accomplished and to address any issues that may arise.

Study of the Intervention

The outcome and process measures and the tools to assess them were chosen to reflect the specific aim of the project: to conduct and evaluate a simulation-based interprofessional patient safety training to prepare clinical educators to become patient safety champions and implement their own simulation-based patient safety training programs. There were two outcome measures for project participants: to conduct a training session using simulation within six months (assessed with the program evaluation tool) and competence as a patient safety educator immediately post intervention (measured with the self-assessment and reflection tool). There was

one outcome measure for the intervention: efficacy of simulation scenarios (measured with the simulation effectiveness tool). The process measures were the change in self-assessment of competency (assessed with the self-assessment and reflection tool) and changes in safety attitude (measured by responses to a SAQ). The tools, the rationale for their use, and validation (where available) are described below. The tools are presented in Appendices N, O, P, Q, & R.

Self-assessment & reflection tool. A self-assessment tool was developed to enable participants to identify their own skills gaps and areas where their knowledge was weak and compare that with improvement during and after the intervention. Self-assessment helps participants stay involved and motivated and encourages self-reflection and responsibility for their learning (Andrade & Valtcheva, 2009). Self-assessment is a strategy employed to encourage learners to take more responsibility for the learning process (Seifert & Feliks, 2019). Ongoing self-assessment enabled the participants to track their progress and focus their attention on specific learning objectives where they might be weak.

The self-assessment tool consists of 10 items in four categories on which the participants rated themselves using a Likert scale from 5: very high to 1: very low. The four categories are patient safety, simulation, interprofessional collaboration and communication, and educational program and leadership (See Appendix N). The participants subjectively rated their own levels of proficiency in each category. The tool was administered pre-intervention to establish a baseline, immediate post intervention, three-months post intervention, and six months-post intervention to identify the retention of the participants' knowledge and skills and impact of the program.

Safety attitudes questionnaire (SAQ). This questionnaire captured the clinicians' attitudes and perceptions toward safety at a specific point in time while working in their healthcare organization. The SAQ has been used widely to measure safety attitudes of medical,

nursing, and other healthcare professionals. The SAQ was adapted from Sexton et al. (2006) and was administered pre-intervention, immediate post-intervention, three months post-intervention, and six months post-intervention. Only one clinical area was modified from the original SAQ (unit/department) to reflect the participants' clinical settings

The SAQ used in this study consists of 30 items in six categories (Teamwork climate, Safety climate**,** Job satisfaction, Stress recognition, Perceptions of management, Working conditions) measured on a five-point Likert Scale from 5: strongly agree to 1: strongly disagree (see Appendix O). Two questions are negatively worded and attitude measures are reverse scored. Internal consistency was demonstrated (Sexton, et al., 2006) as having Cronbach's alpha coefficient of reliability of 0.9 (range: 0.6-0.9). The original English version of the SAQ was translated into Japanese by bilingual physicians and nurses who are experts in patient safety. Back translation and revising were done by other bilingual experienced physicians and nurses who practice in clinical settings, to evaluate the accuracy of the translation. The Japanese language SAQ was then administered to Japanese speaking healthcare professionals who attended different simulation-based courses at our facility to determine the tool's appropriateness for use. Overall Cronbach alpha was 0.9 (rage: 0.7-0.9) in Japanese version which was acceptable.

Simulation effectiveness tool-modified (SET-M). The SET-M tool, created by Leighton, Ravert, Mudra and Macintosh (2015), was used to assess whether the simulation cases were effective for participant learning. This tool assesses participants' perceptions of the effectiveness of learning in the simulation environment in three categories (pre-debriefing, scenario, and debriefing). The original SET-M contains 19 items in three categories (pre-briefing category, scenario, and debriefing), rated on a three-point scale from 1: do not agree to 3:

strongly agree (see Appendix P). For this program, all pre-briefing and debriefing items were used and four items most directly related to the workshop scenarios were used. The original English version was translated into Japanese by bilingual physicians and nurses who are certified healthcare simulation educators (CHSE). Back translation and revising were done by bilingual physicians, nurses, and pharmacists who are experts in simulation-based education. The content validity of the translated version of SET-M was verified by Japanese speaking healthcare professionals who had attended different simulation-based courses at our facility.

Program evaluation. Immediate post- and six months post-intervention evaluations were conducted to collect information and data was used to evaluate the success of the intervention and its outcome. The data was used to evaluate the intervention and inform decisions to improve the program. An open narrative component of the evaluation elicited specific comments on areas for improvement. The immediate-post intervention evaluation consisted of 10 items on a Likert scale of 5: strongly agree to 1: strongly disagree the six months post-intervention evaluation consists of four items assessed on a Likert scale of 5: strongly agree to 1: strongly disagree (see Appendix Q). The evaluation administered six months post intervention consisted of four items (rated on a five-point Likert scale) and three open-ended, narrative response items. It included a question to determine if a participant had conducted a safety training program at their facility within six months post-intervention (see Appendix R).

In-facility safety training evaluation. Post-intervention participants were to conduct a simulation-based patient safety training at their own facility within six months. An evaluation was administered to participants in this training and shared with the DNP candidate as part of the project. The rationale for the evaluation was to help the participant identify strengths and weaknesses in their own teaching and for the DNP candidate to improve the quality of the

intervention. The evaluation consisted of 14 items assessed on a Likert scale of 5: strongly agree to 1: strongly disagree (see Appendix S).

Analysis

Both quantitative and qualitative methods were utilized to evaluate the effectiveness of the intervention. Data from participants was collected online via Moodle. Important variables are demographic data such as age, gender, occupation, number of years in practice, type of specialty, and previous learning and teaching experience with patient safety training and simulation. Questionnaires to obtain data include 1) needs assessment (Likert scale and free text comments), 2) program evaluation data (Likert scale and free text comments), 3) SAQ (Likert scale), 4) SET-M (Likert scale), and 5) whether participants facilitated safety programs after the intervention (quantitative). Statistical analysis (one-way ANOVA) was performed on these main outcomes and important variables. The results were shared with program facilitators upon completion of the intervention and at three-and six-months post-intervention.

Ethical Considerations

There were no potential physical and psychological risks to clinical educators by participating in this project. All responses from participants were and remain confidential. Identifying information was removed from completed questionnaires and stored securely. Access to this identifying information is limited to the DNP candidate and the manager of instructional design/data collection. Findings are reported only in aggregate, thus preserving respondent confidentiality. There was no conflict of interest and no external funding was obtained.

The project aligns with the Jesuit values of promoting excellence through education and social responsibility (Tom, 2015). It is also in accordance with the ethical standards of the American Nurses Association (2015) for improving patient safety and quality in healthcare.

The University of San Francisco and the University of Hawaii Institutional Review Boards (IRB) determined that this project was deemed a quality improvement project. See Appendix T for the DNP statement of non-research determination.

Section IV. Results

Results

Demographics. The participants' demographic characteristics are shown in Appendix U. Combined for both interventions, 26 (55.3%) of participants were female and 21 (44.7%) were male. Sixty-four percent (*n*=30) of the participants were 40 years of age or older. There were 27 (57%) nurses, 11 (23%) pharmacists, 7 (15%) physicians, and 2 (4%) medical engineers. The educational levels of the nurse participants ranged from a nursing diploma to bachelor's degree (*n*=24, 51%) and a master's degree or higher (*n*=16, 34%). Almost half (*n*=23, 49%) of the participants work at critical care (ICU/ER/OR) and one-third (*n*=13, 28%) of the participants work at academic institutions and patient safety management department. Thirty-two participants (68%) work at teaching hospitals with over 500 beds. In terms of years of clinical experience, fifty-one percent (*n*=24) of the participants reported over 15 years of experience years. The roles of participants are clinical educator (*n*=17, 36%), manager/director (*n*=16, 34%), and educator in academic (*n*=14, 30%). Sixty-four percent (*n*=30) of participants reported no patient safety teaching experience. Sixty-two percent (*n*=29) reported no interprofessional teaching experience, and sixty-four percent (*n*=30) reported experience teaching using simulation.

Intervention Process. The intervention was offered twice in Japan, with 23 and 24 participants attending. All 47 participants completed pre- and immediate-post questionnaires. At three-months post, 39 participants (83%) completed a follow up video-conference session and the online questionnaires. At six-months post-intervention, 36 of the initial 47 participants (77%) followed up via videoconference and online questionnaires. Thirty-two of the 36 participants (89%) taught a patient safety session at their facility within six-months of completion of the intervention (see Appendix V).

Self-assessment and reflection results. Self-assessment and reflection results are shown in Appendix W. There was marked improvement in the self-assessment rating on each of the 10 program objectives, from the smallest change between pre and six-months post-intervention, "Acquire basic facilitation and debriefing techniques" (79%) to the greatest change in the same period, "Implement the simulation-based safety session" (203%).

Mean percent positive scores (0-100%) were calculated for participant responses of agree (4) and strongly agree (5) on the questionnaire's five-point Likert scale. At pre-intervention the self-assessment ratings were 0% for "Utilize simulation methods to teach patient safety" "Develop a plan of simulation session for patient safety", and "Implement a simulation-based patient safety session" were 0% at pre-intervention. The highest self-assessment rating at pre-intervention was "Report critical patient information with other team members using a structured method (SBAR)" at 22%.

At six-months post intervention, the greatest increase (81%) was in, "Use effective communication methods to express concerns and challenge one another in a case of potential harm to a patient (two challenge rule)". "Implement the patient safety simulation session," with 0% rating at pre, increased to 68% at six-months post-intervention. "Develop a plan of

simulation session for patient safety" increased by 66%; and "Utilize simulation-methods to teach patient safety" increased by 63%. The smallest change was in "Acquire basic facilitation and debriefing techniques," a 47% increase.

SAQ results. The results of the safety attitudes questionnaire (SAQ) are presented in Appendix X. Mean percent positive scores (0-100%) were calculated for participant responses of agree (4) and strongly agree (5) on the questionnaire's five-point Likert scale. The attitude questionnaire items with the greatest changes were "Perception of management," with a 16% change from pre-to three-months post-intervention, and "Stress recognition," which increased 16% from pre-intervention to six-months post-intervention. "Safety climate," "Job satisfaction," and "Working conditions" increased 9% from pre-intervention to six months post-intervention. "Teamwork climate" had almost no change over the duration of the program, with 0% change between pre and six-months post intervention.

SET-M results. SET-M results indicate agreement or disagreement with the effectiveness of the intervention (see Appendix Y). Mean percent positive scores (0-100%) were calculated for participant responses of somewhat agree (2) and strongly agree (3) on the questionnaire's three-point Likert scale. Ninety-four percent of participants (n=44) agreed or strongly agreed that the prebriefing was effective; eighty-seven percent (n=41) agreed or strongly agreed that the two scenarios were effective; and eighty-nine percent (n=42) agreed or strongly agreed that the debriefing was effective.

Immediate post intervention evaluation. The results of the immediate post intervention evaluation are presented in Appendix Z. Participant evaluations immediately post intervention indicated high levels of satisfaction (i.e., agreed or strongly agreed) with meeting objectives and expectations, expertise and effectiveness of the facilitators, quality and effectiveness of materials

and content, and ability to apply knowledge and skills acquired. Ninety-three percent of participants (*n*=44) agreed or strongly agreed that the "workshop objectives were identified and met;" ninety-two percent (*n*=43) agreed or strongly agreed that " the workshop met my expectations and my needs," "the facilitators used a variety of instructional methods," and "workshop materials were useful/helpful." Only two items "the length of the workshop was appropriate to the content of the training" (*n*=34, 73%), and "the online pre-workshop e-learning materials were useful" (*n*=37, 79%), were rated below 80%.

Representative feedback from the post-intervention evaluation:

- "I was able to gain knowledge and skills, especially in the concept of "just culture."
- "The course changed my poor knowledge/skills and perception of patient safety to positive attitude. I want to be a safety champion in my unit and lead our staff."
- "I feel more confident in effective communication methods after taking this workshop."
- "The learning environment was safe and motivated me to learn more!"
- "I wish there was more time overall. A two-day course would be better."
- "I would like to have more facilitation and debriefing activities."
- "I would have been nice to have more discussion time."

Six months post-intervention evaluation. The results of the six months post intervention evaluation are presented in Appendix Z. The evaluation administered six-months post intervention consisted of four items (rated on a five-point Likert scale) and three open-ended, narrative response items. The evaluation included a prompt on the number of simulation-based safety training sessions the participant had completed.

Percentages below represent combined "agree" or "strongly agree" responses to the prompts. "I feel my attitude toward patient safety became positive after I took this program" (*n*=33, 92%).

"The entire program met my expectations and my needs" and "follow up video conference at three months and six-months were helpful" (*n*=32, 89%). "I would recommend this program to other healthcare professionals/educators" (*n*=30, 84%).

Eighty-nine percent (*n*= 32) of participants taught a simulation-based patient safety training session at their own institution. Sixty-one percent (*n*=21) taught one session, 14% (*n*=5) taught two, and 14% (*n*=5) taught three or more sessions. Eleven percent (*n*=4) did not teach a session within six months.

Representative responses to evaluation questions:

1) Has your participation in the patient safety workshop improved your competency in areas of your professional role as clinical educator?
    - "I was able to gain patient safety knowledge and skills"
    - "I never used simulation for patient safety but now I know how to teach safety using simulation"
2) What specific knowledge, skills, or experience did you gain/obtain from this workshop?
    - "Effective communication skills (SBAR, two challenge rule)"
    - "Concept of Just Culture"
    - "How to create a safety training using simulation"
3) How has your participation in the patient safety workshop (developed and taught a safety program) impacted your confidence to be a safety champion?
    - "I feel confident to develop and teach another safety session"
    - "I feel comfortable to be a safety champion in my department"
    - "Experience in teaching safety program gave me a confidence as an educator and safety champion"

Section V. Discussion

Summary

The project aims were achieved by reaching or exceeding the specific targets and providing evidence that SBE can be a practical and cost-effective approach to gaining the knowledge, skills, and confidence needed for international healthcare educators to become patient safety champions and train hospital staff in safe-patient care. From the SET-M measure, the prebriefing, two scenarios, and debriefing were highly effective. Narrative comments similarly indicated high levels of satisfaction with the program, with participants highlighting knowledge and skills gained and confidence increased, enabling participants to conduct their own patient-safety training sessions post-intervention.

Key findings. One of the key findings from the self-assessment measure was that comfort levels with using SBE in patient-safety training were absent pre-intervention, but increased between 31% and 47% immediately post intervention, and increased again by more than 16% at six months post after having conducted a training session at their facility. This finding points to the effectiveness of simulation in a short program to develop the comfort levels needed for participants to conduct simulation-based training on their own.

Another key finding was the importance of post-program follow up. From the self-assessment measure, scores dropped at three months post intervention in all categories except promoting safety culture. This finding suggests that some of the initial post-program confidence and enthusiasm was lost after participants returned to the challenges of their professions and pointed to the importance of post-program follow up.

The greatest change in safety attitudes revealed by the six SAQ categories, was the increase in “perception of management”. This finding suggests that through gaining knowledge

and skills in patient-safety training, the participants altered their views to take a more positive stance on how hospital administrators supported these healthcare educators in fulfilling their roles and responsibilities. This more positive perception of the administrator's role may encourage the new patient safety champions to seek support for simulation-based patient safety training.

Important contributing factors. Two factors that made important contributions to the success of the intervention were the effectiveness facilitators in applying adult learning theory and the motivation of participants. Facilitators were effective in incorporating adult learning theory and using educational interventions that were appropriate for the participants, objectives, scope, and timeframe of the intervention. In following the Trio Model of Adult Professional Learning (Shekley, Kehrhahn, Bell, & Grenier, 2008), the facilitators ensured that the three key components (individual attributes, key experiences and learning environment) were present so that optimal professional learning could occur.

Participants were motivated and ready to learn (100% of participants completed pre-course materials and questionnaires). Teaching a safety session was an opportunity for triggering the participants to immediately apply what they had learned and use the knowledge and skills acquired as a basis for behavioral change. The follow-up sessions at three and six months were meaningful to the participants and helped them retain confidence and enthusiasm for teaching using simulation.

Unexpected outcomes. One positive yet unexpected outcome was that 77% of participants completed the program, i.e., participated in the one-day program, completed all surveys and questionnaires, participated in follow up, and taught a patient-safety session within six months. This was higher than expected in light of the participants' initial lack of experience

with SBE, low comfort levels with using simulation, and their many professional duties and responsibilities in their daily work environment. A second unexpected and extremely satisfying outcome was the high percentage (89%) of participants who developed and taught a safety-training session using simulation within six months. A third unexpected outcome was that participants were well educated and highly motivated but their attitudes on safety climate assessed at pre-intervention were lower than benchmark (see Appendix X).

Emerging possibilities. An encouraging new possibility that emerged from this evidence-based project was promoting a safety culture through a safety champion model. At pre-intervention only 9% of participants saw themselves as able to promote a safety culture in their organization as a safety champion. During the intervention, the number of participants expressing a willingness and ability to serve as a safety champion continued to increase, ultimately reaching 74% at six months post-intervention. This suggests the attractiveness of using a safety champion model to develop leaders in safe patient care. Although the intervention focused on patient safety, many of the participants learned widely applicable basic facilitation and debriefing skills. In future interventions, it may be helpful to add more time to practice facilitation and debriefing skills if the participants are novice educators.

Dissemination plan. The DNP candidate intends to use information obtained during the DNP project to submit a manuscript for publication in an international peer- reviewed journal focused on simulation-based education. Additionally, the DNP candidate plans to present at international conferences on simulation and patient safety, including the 2020 International Nursing Association for Clinical Simulation and Learning (INACSL) and the 2020 International Meeting on Simulation in Healthcare (IMSH), for which a podium presentation has been accepted. The DNP candidate also plans to present relevant information from this project to

stakeholders in healthcare organizations who have dual interests in simulation-based education and Joint Commission International (JCI) accreditation.

Implications for Advanced Nursing Practice and Nurse Leadership

Evidence based practice (EBP) has been shown to lead to improved safety outcomes of patients by mitigating medical adverse events (Koh, Manias, Hutchinson, Donath, & Johnston, 2008). However, patient-safety training based on the concept of EBP is rarely incorporated into educational and clinical settings in Japan (Matsuoka, 2010), where lecture-based approaches or routine clinical observation predominates for patient-safety training. This creates an opportunity for international healthcare educators and advanced practice nurses to take the lead in incorporating EBP into clinical settings for patient-safety training and disseminating information about the benefits of this practice. SBE and the train-the-trainer model with safety champions provides a practical way for healthcare educators and advanced practice nurses to introduce EBP concurrent with improving safety outcomes of patients. Since no Doctor of Nursing Practice (DNP) degree has been established in Japan, Clinical Nurse Specialists (CNS) or advanced practice nurses are expected to assume leadership roles. Those who know how to incorporate EBP (one of the eight DNP competencies) have a leadership opportunity to enhance the competencies of multi-healthcare professionals with the potential to directly impact safe patient care. A key factor in sustaining EBP is the presence of EBP mentors within a healthcare system. Advanced practice nurses, skilled in EBP and engaged in mentorship, can serve as role models, to engage staff in EBP and promote behaviors consistent with evidence-based best practices (Sredl, et al., 2011).

Merrill (2015), pointed to the need for strong nursing leadership in order to promote patient safety. There is an active role for nurse leadership in creating a safety culture so that

front-line nurses feel comfortable bringing up safety concerns. The DNP project demonstrated how simulation-based, non-technical skills training in interprofessional practice (specifically, situational awareness and using the two-challenge rule to resolve conflict) can lead to greater confidence and competency in advocating for safe patient care, either situationally or as a matter of ongoing practice. Additionally, Waxman (2014) has demonstrated that simulation may be used for leadership skills assessment and development. As nurse leaders are increasingly responsible for both patient safety culture and facilitating interprofessional work relationships, simulation-based training in interprofessional communication skills can benefit nurse leaders and those health professionals who work in the unit they are responsible for.

Braddock, et al. (2014) have shown that unit-based approaches can concurrently improve safety culture and clinical outcomes. In parallel, Rosen, Pronovost, Weaver, Hunt, and Federowicz (2012) have determined that simulation training is a good fit for unit-based approach to improving patient safety as it fosters deliberate practice and can help uncover latent safety threats. This DNP project suggests that simulation-based training could be a useful tool in the toolbox of a nurse leader responsible for both safety culture and improving clinical outcomes in a unit.

Maxworthy and Kutzin (2014), have identified simulation as a critical component in process improvement strategies targeting improved patient outcomes. Simulation-based education (SBE) enables acquisition of specific competencies in a short time. Even with limited resources and limited technology, SBE is a practical way to simulate real-world situations without harming patients and provide learners the opportunity to build competency and confidence. Simulation enables educators to emulate a high-quality clinical experience in a safe, non-threatening environment, and without subjecting patients to potential harm (Waxman,

Bowler, Forneris, Kardong-Edgren, & Rizzolo, 2019; Sanko, 2017). Simulation of an intervention, accompanied by analysis of behaviors and actions at the individual or team level, has the potential to directly impact patient safety (Schmidt, Goldhaber-Fieberg, Ho, & MacDonald, 2013). For advanced practice nurses, nurse leaders, and clinical educators who acquire skills and knowledge in SBE, this educational approach provides an alternative to classroom-based training and expands their horizons in their own specialties as educators.

To promote wider adoption of SBE as a pedagogical approach for nurse educators, current practitioners of SBE in healthcare need to dispel the myth that SBE requires a specially equipped facility, high-fidelity mannequins, and deep technical knowledge. This misperception prevents nurses from taking advantage of the opportunity to incorporate SBE into their own practices as educators. As educators, creativity and effectiveness is often a stronger determinant of learner outcomes than the equipment or facilities used.

The DNP project provided a model for how a simulation-based patient safety training program could potentially mitigate medical adverse events (specifically medication errors) and RN turnover, both of which heavily impact the balance sheet of a healthcare organization or system. This model enables building a business case for a patient safety training program, which could prove useful to a nurse leader with financial management responsibilities. Although, as a non-research project, its generalizability is limited, the approach provides a framework that a nurse leader could adapt to a specific situation.

Interpretation

Comparison with published research. The outcomes of this project were consistent with and slightly better than the outcomes of a study by Ahmed (2013) on a half-day, train-the-trainers patient-safety program for senior doctors. In Ahmed's program, 72% of participants

facilitated a patient-safety session within eight months of participating. By comparison, 89% of the participants who completed the DNP project intervention taught a patient safety session within six months post-intervention. In both Ahmed's program and the DNP project, participants' attitudes and skills improved immediately post-intervention. Improvement was sustained after facilitating a training session several months post intervention.

The Japanese-language published literature on safety attitudes did not offer an equivalent 30-item safety attitudes questionnaire (SAQ) to the one used in this DNP project, nor were there any published studies on Japanese health professionals' safety attitudes that could be used for comparison. Lacking a Japanese equivalent to the WHO pilot study by Sexton et al. (2006), the results of the Sexton et al.'s study provided the benchmark for comparison of SAQ scores obtained in this project. For the DNP project participants, at pre-intervention, the mean average score and percentage of strongly agree/agree (positive attitude) in each of the six categories was lower than in Sexton's study (see Appendix X). When comparing percentages, all scores of DNP project participants at pre-intervention, except "job satisfaction," were lower than the benchmark. Comparing at six months post, all scores except "job satisfaction" and "stress recognition" were lower than the benchmark.

While there are no clearly identifiable reasons for the differences, some conjecture can be offered. In the study by Sexton et al. (2006) the participants were from the same organization, so perhaps attitudinal changes were influenced by a common organizational culture and the continued interaction of colleagues post-intervention, while in the DNP project, participants were from different organizations. As such, outcomes from the DNP project reflect individual attitudinal changes that had to be sustained without the influence of shared experience. Additionally, there were no Asian countries in the Sexton et al. (2006) study. Given the small

sample size of the DNP project and participant representation from various professions, correlation between participants' backgrounds and six factors of SAQ could not be determined. No conclusions could be drawn from the DNP project data on occupation-based differences in safety attitudes due to the small sample size and unbalanced participant composition.

A study of physicians, nurses, and nurse assistants who had received no information about patient safety during their initial or continuing professional education had less positive attitudes to teamwork climate, safety climate, job satisfaction, perceptions of management and working conditions than those who had received some patient safety education (Brasaite, Kaunonen, Martinkenas, & Suominen, 2016). As Japanese healthcare professionals receive little or no patient safety training in initial or continued professional education (Kamishiraki, Starkey, & Maeda, 2011), this helps explain the low pre-intervention SAQ scores in the DNP project.

For the DNP project, at three months post-intervention there was a slight decrease in self-assessment measure scores in all categories except "promoting safety culture." This is consistent with the findings of George and Quatrara (2018) that retraining at three months is beneficial for maintaining knowledge and skills. Three-months post intervention was the right time to provide follow-up support to the participants in the DNP project and to encourage participants to be active as safety champions and facilitate a training session. Future longer-term studies on timing and efficacy of simulation-based retraining intervals are needed.

Impact on people and systems. As the final measures in this evidence-based project were conducted at six-months post intervention, the DNP candidate was not able to measure long-term impact on people and systems. Similarly, the DNP candidate was not able to draw conclusions about the sustained effects participants' changes in patient-safety competency or patient-safety attitudes on themselves or their organizations. Designed with a train-the-trainer

approach, it is incumbent on the participants, as safety champions, to have an impact on safe patient care at their organizations. The intervention did not directly measure patient safety outcomes such as medication errors before or after the intervention, as this data was unavailable. Additionally, the participant population was too small and the timeframe too short to expect a measurable change on safe patient care at the organizational level. This is an important area of investigation for future long-term, large-scale studies as there is little to no published research on such organizational effects on safe-patient care in Japan.

Conceptual frameworks. The conceptual frameworks used in this DNP project were effective in supporting the outcomes. Adult learning theory (Knowles, 1970) holds that adults learn better when they are active participants in learning relevant content and can directly apply what they learn. Adult learners have a depth and breadth of experience that makes them rich resources for others in a collaborative learning environment (Knowles, 1978). For the DNP candidate, understanding adult learning theory was critical for designing the intervention. The positive outcomes of the DNP project in terms of changes in self-assessment of patient-safety competency and safety attitudes illustrate Knowles' principles in action. The outcomes are in line with the findings of Zigmont (2011) that simulation-based education, provided in the context of adult learning theory, best practices can have a positive impact on learners. Zigmont (2011) extends this impact to the patients the learner serves. Although this impact could not be assessed given the scope of the DNP project, it hoped that this too will be the case. Longer-term impact on patient safety resulting from adult-learning theory applied to simulation-based patient safety education is a rich area to explore for nurse educators and advanced nursing practice.

The Kirkpatrick evaluation model (Kirkpatrick, 1994) has four levels: reaction, learning, behavior, and results. This model was useful in the design of the intervention and measures as it

presents evaluation goals at each level, provides indicators of effectiveness, and identifies areas of improvement. In the DNP project, the first level, reaction, was ascertained by how well the learning objectives were met and the overall satisfaction with the workshop. The second level, learning, was evaluated with the self-assessment & reflection tool, SET-M, SAQ, and evaluation questions. Behavior change, the third level, was determined by whether participants taught a safety session within six-months post intervention. The fourth level, results, included an evaluation of participants' teaching effectiveness as safety champions. Following the Kirkpatrick evaluation model enabled the learner to design a very systematized way to evaluate improvement and outcomes that lent itself to both qualitative and quantitative measures and could be replicated in or adapted to future studies of simulation-based training.

Limitations

As this evidence-based DNP project was a non-research study, there are limitations to the generalizability of the results. Caution should be used in making inferences from the outcomes due to the small population size and unique participant composition of the project. Some of the bias limitations of the project were: a) selection bias in that the participants volunteered to participate and were highly-motivated learners; and b) self-reporting bias in that the participants rated themselves on their knowledge, skills, and attitudes, with the possibility that participants engaged in under or overestimation of knowledge and skills, wishful thinking about their competencies or were subjected to social desirability bias through interaction with peers. Additionally, there were individual confounding factors due to the ages, clinical experience, educational backgrounds, and occupations that may have affected the SAQ results. These could not be identified nor could correlations be drawn due to study design, small numbers of participants, and unbalanced representation of occupations. The small sample size of the study

may have impacted the SAQ results. A larger participant sample size in future studies could enhance understanding of attitudes toward safety climate that were not clear from this study. An additional limitation was the absence of Japanese SAQ data to compare as a benchmark. The benchmark used contained no Asian healthcare professionals and thus cultural factors that may have accounted for differences could have introduced a confounding factor. As participant follow up ended at six months post intervention, no data on longer-term impact on individuals or their organizations could be collected. A future opportunity for extending this study would be to implement the training with participants from specific unit in an organization analyze the effects on participating individuals as well as a potential group effect, and measure the impact patient outcomes, including reduction in medication errors.

The disadvantage of long-term follow-up project design is a reduced response rate at six-months post-intervention. Therefore, the data collection for this project was included in the obligatory follow-up videoconferences that they agreed to as part of their participation contract. Participants who comply with all the follow-requirements earned a certificate of completion. A challenge for the participants was to engage as safety champions and conduct sessions at their own locations at least once within six months. In order to reduce adverse events and promote a safety culture, these new champions need to continue to engage staff and conduct sessions at their organizations. The follow-up videoconferences at three and six months were able to support the new safety champions in overcoming any obstacles they have had encounter.

Conclusions

Patient harm during hospital stays is a leading cause of morbidity and mortality worldwide. It does not have to be so, as adherence to ordinary standards of professional competency and safe patient care could greatly reduce the number of adverse effects and

improve patient outcomes. Healthcare educators, including advanced practice nurses, can play a critical role in a healthcare system's mitigation of harm and provision of safe patient care by establishing practical interprofessional education and training programs that enhance patient safety competency. This DNP project demonstrated how simulation-based, patient-safety training for interprofessional healthcare educators, a new approach in Japan, can help bridge the gap between the lack of patient safety education for healthcare providers in clinical practice necessary to reduce patient adverse events during hospitalization. The specific aims of the DNP project were achieved in increasing the knowledge and skills of interprofessional healthcare educators enabling them to be effective patient-safety trainers and effecting positive attitudinal change to promote a culture of safety in their own organizations.

Section VI. Funding

There was no external funding for this DNP project.

Section VII. References

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Section VIII. Appendices

Appendix A

Evidence Evaluation Table

Citation	Design/Methods	Findings	Limitation	Evidence Quality & Rating
Ahmed, Arora, Baker, Hayden, Vincent & Sevdalis (2013).	Program development and evaluation 216 senior MD volunteers who become faculty leaders for patient safety training attended a 1/2-day patient safety training	Engaged safety training as facilitators & learners Effective way to deliver training in safety field Scores of patient safety knowledge (pre course median=70%, post course=80%, 8 months post=90% Attitudes (pre/post: 0.516/0.934) Skills (pre median=3.38, post=4.13, 8 months= 4.0)	Sample size was confined within a single health region of the UK and therefore the generalisability of our findings could be questioned. Recruited targeting senior physicians with an interest in patient safety. Response rate at 8 months was only 51%	Level: V Quality: B.
Schmidt, Goldhaber-Fiebert, Ho, & McDonald (2013)	A systematic review 22 RCTs, 11 prospective observational, 5 retrospective analyses	Simulation-based training improved team performance and enhanced interpersonal collaboration. Limited evidence suggested improvements in patient outcomes were attributable to simulation-based training in healthcare systems. The authors suggested a need for future studies to utilize standardized reporting of simulation components and consistent identification desired patient safety outcomes.	Limited assessment of quality of evidence to study design. It was not performed a structured assessment of the quality of evidence. The quality of the evidence for simulation-based education to improve patient safety need be interpreted carefully.	Level: III Quality: A.

Citation	Design/Methods	Findings	Limitation	Evidence Quality & Rating
Cook, Hatala, Brydges, Zendejas, Szostek, Wang, Erwin & Hamstra (2011)	A systematic review & Meta-analysis	Found a consistent positive relationship between simulation-based training for health professionals and large, positive effects when knowledge, skills, and behaviors were evaluated and moderate effects when patient-related outcomes were evaluated. There is an association between improved outcomes and simulation-based training across various clinical topics, including large effects on clinician behaviors and moderate effects on patient care.	Available studies are not high quality. Majority of studies had limitations in methodology.	Level: III Quality:A/B
McGahie, Draycott, Dunn, Lopez, & Stefandidis (2011)	Qualitative Synthesis	Simulation-based medical education (SBME) translational science research can return on financial investment and contributes to long-term retention of aquired clinical skills. SBME translational science research can contribute to better paitnet care and improved patient safety.	Challenges: Translational scientists cannot be studied some important clinical problems beyond the T2 level. Translational science research needs to take a leadership in healthcare. clinical performance competency standards for healthcare professionals are needed but absent.	Level:III Quality:A

Citation	Design/Methods	Findings	Limitation	Evidence Quality & Rating
Lane, A. J., & Mitchell, C. G. (2013).	Program evaluation	To use the 3-step train the trainer model to develop a core simulation champion can be effective and efficient in many areas. This train-the-trainer model is effective and efficient to develop champions	Challenges: People who were interested in being simulation champions were not chosen. Scheduling time for the follop-up activities and maintaining momentum was challenging	Level: V Quality: B
Motola, I., Devine, L. A., Chung, H. S., Sullivan, J. E., & Issenberg, S. B. (2013).	Evidence practical guide A systematic review	Simulation-based education as part of the solution in reducing medical errors and enhancing patient safety in support of the healthcare educational goal to advance healthcare provider's competency and provide the safest care to their patients	n/a	Level: IV Quality: A
Weinger, M., & Gaba, D. (2014).	Nationally recognized expert committies/consensus panels based on scientific evidence	Human Factors Engineering (HFE) is the application of knowledge about human characteristics, capabilities (physical, emotional, and intellectual). HFE principles and methods are applied to patient safety issues in anesthesiology. Simulation is a powerful methodology to be used by clinicians and medical education and it helps advance patient safety. Effective application of HFE can improve patient safety, quality of care, and reduce healthcare costs.	n/a	Level: IV Quality: A

Citation	Design/Methods	Findings	Limitation	Evidence Quality & Rating
Blackmore, A., Kasfiki, E.V., and Purva, M. (2017).	Systematic review	The review suggest that a simulation is an effective tool for team training focused on human factors and when put into practice in healthcare, can have a positive impact on patient outcomes.	Communication and simulation terms came back a large number of articles which was not healthcare related. Studies involving communication between clinicians /patients/ interprofessional communication increased this heterogeneity	Level: III Quality: A/B
Gordon, M., Fell, C. W. R., Box, H., Farrell, M., & Stewart, A. (2017).	Qualitative study	Interprofessional learner groups that had received simulation-based training had increased non-technical skills useful in mitigating intergroup barriers.	A single hospital setting and with students from two undergraduate colleges. Focus group method is limited Participants were from a specific simulation-based NTS intervention group	Level: III Quality:A/B
Hegland, P. A., Aarlie, H., Strømme, H., & Jamtvedt, G. (2017).	A systematic review & Meta-analysis RCT	Simulation-based training to have a greater effect on nurses' skill improvement when compared to other training approaches. Importance of quality improvement in healthcare to increase patient safety and included simulation-based training a quality-improvement strategy for healthcare.	It might have the risk of bias assessment and grading of evidence due to analysing only the articles.	Level: III Quality:A/B
Issenberg, S.B., McGaghie, W.C., Petrusa, E.R., Gordon, D.L., & Scalese, R.J. (2005).	A systematic review	High-fidelity simulations are effective and enhance medical education in patient care settings.	Did not evaluate whether simulators are more effecitve than traditional or other methods	Level: III Quality:A/B

Appendix B

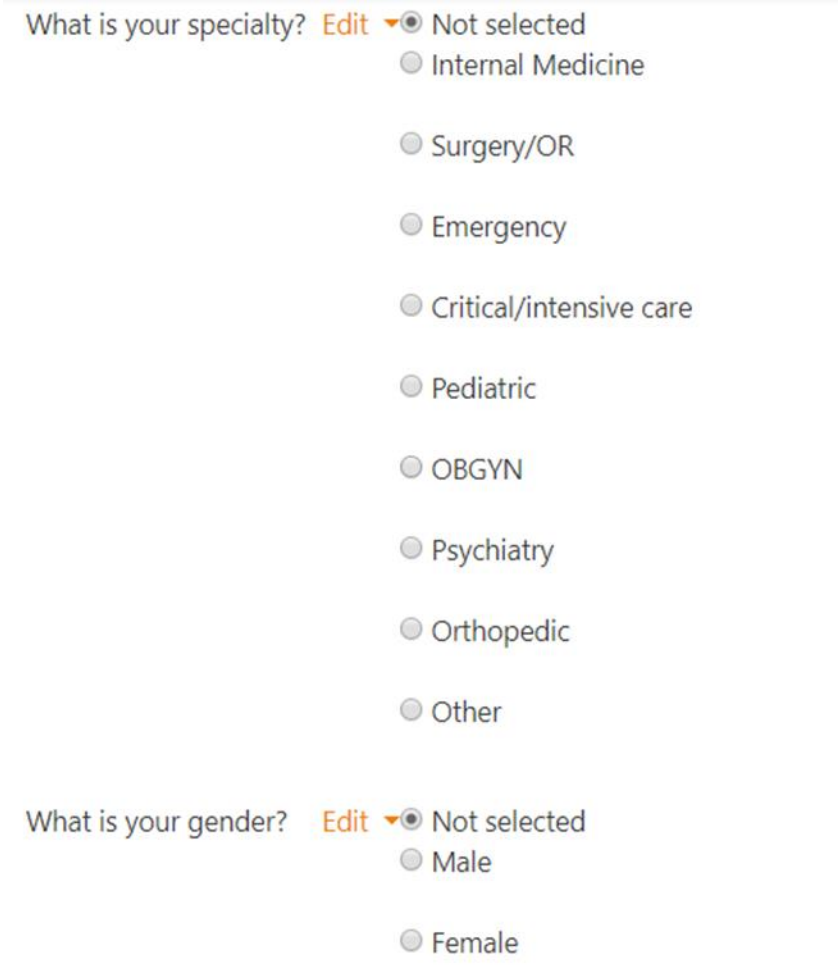
Demographic & background questionnaire (Moodle)

What is your occupation? Edit

- Not selected
- Physician
- Resident physician
- Advanced Practice Nurse (Certified/specialize)
- Registered Nurse
- Pharmacist
- Non-healthcare
- Other

What is your highest level of education you have completed? Edit

- Not selected
- Diploma
- Associate degree
- Bachelor's degree
- Master's degree
- Doctorate degree


What is your specialty? Edit
Not selected
Internal Medicine
Surgery/OR
Emergency
Critical/intensive care
Pediatric
OBGYN
Psychiatry
Orthopedic
Other
What is your gender? Edit
Not selected
Male
Female

What is your age? Edit

- Not selected
- <29 years
- 30-39
- 40-49
- 50-59
- >60 years

How long have you been practicing or how long have you practiced in your profession? Edit

- Not selected
- <4
- 5-9
- 10-14
- 15-19
- 20-24
- >25

How often do you spend teaching or in activities related to educating others in a month? Edit

- Not selected
- 0
- 1-5
- 6-10
- 11-15
- >15

Who are your learners? Edit

- Not selected
- Medical students
- Nursing students
- Pharmacy students
- Allied health students
- Clinical nurses
- Advanced practice nurses
- Resident physicians
- Other

What is your current role/position? Edit

- Not selected
- Professor (associate/assistant/adjunct)
- Director/assistant director of the department or unit
- Clinical educators
- Staff (nurse/physician/pharmacist)
- Non-healthcare

What type is your hospital and what is the size of your hospital? Edit

- Not selected
- Academic medical center (resident education) >500
- Academic medical center (resident education)<500
- Academic medical center (non-resident education) >500
- Academic medical center (non-resident) <500
- Public hospital >500 beds
- Public hospital <500 beds
- Private hospital >500 beds
- Private hospital <500 beds

Have you taught or are you currently teaching patient safety program? Edit

- Not selected
- Yes
- No

Have you taught or are you currently teaching interprofessional education? Edit

- Not selected
- Yes
- No

Have you taught or are you currently teaching using simulation-based education? Edit

- Not selected
- More than 3 years
- 1-2 years
- less than 1 year
- None

Are you currently involved a patient safety or quality improvement project? Edit

- Not selected
- Yes
- No

What type of educational method do you use or prefer to learn patient safety? Edit

- (•) Not selected
- ( ) Lecture
- ( ) Group discussion
- ( ) Simulation
- ( ) Roleplay
- ( ) e-learning
- ( ) Video
- ( ) A mixture of above methods
- ( ) Other

Edit

Have you had a simulation based education before? Edit

- [ ] Yes
- [ ] No

Have you participated a patient safety workshop before? Edit

- (•) Not selected
- ( ) Yes
- ( ) No

If you participated the patient safety program before, what type of learning method did the program use? (check all that apply) Edit

- [ ] Lecture
- [ ] Video review
- [ ] Group discussion
- [ ] Role play
- [ ] Simulation (high fidelity manikin, SP etc.)
- [ ] Other

Please describe the challenges or issues you are facing regarding patient safety Edit

Appendix C

Workshop Agenda

Sim-based Patient Safety Healthcare Educator Workshop

January, 2019

SimTiki Simulation Center
John A. Burns School of Medicine
University of Hawaii

Time	Title	Session
9:00 – 9:15	**Welcome & Introduction** Survey & Self-assessment	
9:15 – 9:55	**Intro to Patient Safety**	Presentation
9:55 – 10:05	**Team Exercise**	Activity
10:05 – 10:15	**Break**	
10:15 – 11:45	**Why Simulation?** **Basic facilitation & debriefing**	Presentation/ Activity
11:45 – 12:35	**Lunch & Group Photo**	
12:35 – 13:05	**Observational assessment**	Activity/Discussio
13:05 – 13:35	**Interprofessional Collaboration**	Presentation/Dis cussion
13:35 – 14:05	**Interprofessional Communication**	Video/Activity
14:05 – 14:15	**BREAK**	
14:15 – 15:45	**Scenarios (Safety & Communication)**	Simulation
15:45 16:45	**Develop a plan for safety training**	Group work
16:45 17:00	**Post course evaluation & self-assessment**	
17:00 17:00	**END**	

Appendix D

Scenario A: Standardized Communication

SBAR & 2 challenge rule

Nurses, Physicians & Pharmacists (clinicians)

GOAL: Part 1: Share a mental model through effective communication **Part 2:** Provide mutual support in a healthcare team and communicate effectively
Specific Learning Objectives
Part 1: Report critical patient information using structured method (SBAR). **Part 2**: Use effective communication methods to express concerns and challenge one another in a case of potential harm to a patient. (Use 2 challenge rule, repeat back, and closed loop communication)

Target Learners: Physicians, Nurses, & Pharmacists who practice in clinical settings

Total Time: 50 minutes
Orientation Time: 5 minutes
Scenario Time: 15 minutes (7 minutes Part 1, 7 minutes Part 2)
Debriefing Time: 30 minutes (15 minutes Part 1, 15 minutes Part 2)

Evidence Base/References:

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Scenario orientation (5 minutes):

- Review objectives of the scenario
- Explain the length of the scenario and how scenario will end
- Explain that debriefing will immediately follow the scenario. Time: 15 minutes
- Describe each role and responsibility (patient, facilitator, and peer evaluator)
- Explain the physical environment (e.g., room setup)
- Explain available equipment
- Provide patient details, setting, and learner's tasks
- Give an opportunity for questions

SCENARIO SCRIPT

Case Summary:

A 75-year-old female was transported by ambulance to an ER from a nursing home due to a 4-day fever. An EMT gave a list of medications and report to a nurse.

A nurse and an ER pharmacist retrieve relevant patient information and the nurse gives a report to a resident physician assigned to the patient.

The patient was diagnosed UTI. The resident physician prescribed an antibiotic and gave the order to the nurse. However, the nurse needs to clarify the order with the pharmacist and resolve conflict with the physician.

Scenario Overview:

The first part of the scenario focuses on structured communication using SBAR to report to the physician. The second part of the scenario focuses on communication using the 2-challenge rule to clarify and/or correct the order.

Scenario Cast/Role:

Part 1:

Cast	**Role**
EMT	Confederate, facilitator (#1)
Resident Physician	Learner, receives SBAR report
Nurse	Learner, provides the SBAR report
Pharmacist	Learner, helps nurse to put SBAR info suggest from pharmacist perspective
Peer evaluators (other learner group)	Assess using checklist
Facilitator (#1)	Timekeeper, Assess using checklist

Part 2:

Cast	**Role**
Resident Physician:	Confederate, facilitator (#1)
Nurse:	Learner, completes the task (using 2-challenge rule)
Pharmacist	Learner, suggests medication dose
Peer evaluators (other learner group)	Assess using checklist
Facilitator (#2)	Timekeeper, Assess using checklist

Patient Profile:

- A 75-year-old female
- History: Hypertension, CKD (no hemodialysis), & UTI
- Diagnosis: UTI
- Medication: Norvasc 5mg PO q.d.
  Tylenol 1000mg PO prn
- Allergies: NKA
- Lab: Na=142
  K=4.6
  Cl=106
  HCO3=20
  BUN=28
  Cr=2.5

VS: BP=110/70
HR=98
RR=14
T=38.0c
SPO2=96

Scenario Setting:

- Nurse station in the ER

Settings (equipment/environment in a room):

1) Desk
2) 3 Chairs
3) 2 Laptop Computers (1 is okay if there is no 2)
4) 2 Phones (resident & nurse)
5) Patient's medication list (a note)
6) 2 SBAR forms
7) 3 Pens
8) Patient's Medical Chart (EMR)
9) Medication order sheet (Part 2 only)

Learner's Task:

- Part 1:
  Nurse: Retrieve relevant patient information and report using SBAR to a resident physician assigned to the patient.

  Physician: Receives SBAR report from the nurse.

  Pharmacist: Helps the nurse retrieve critical patient information. Makes suggestion based on patient history.

- Part 2:
  Nurse: Clarifies the order with the pharmacist. Uses 2 challenge rule to resolve a prescription issue with the resident physician.

  Pharmacist: Suggests medication dose to the nurse. Confirms a new order with the nurse after the physician corrected the order.

- 7 minutes to complete each part of the task (14 minutes total)

Critical Learner Actions:

Part 1: Retrieve relevant critical patient information on situation, background, assessment, make a recommendation and report

Part 2: Use 2-challenge rule to resolve the issue. Repeat correct order back to the physician. Use closed loop communication to confirm the new order.

Scenario End Points:

Part 1:
- When 7 minutes is up, or
- Report using SBAR is complete (learner objectives met)

Part 2:
- When 7 minutes is up, or
- conflict is resolved through 2-challenge rule, repeat back, and closed loop communications (learner objectives met)

Case Flow/Trigers/Scenario Development States			
Initiation of Scenario: **Part 1:** A nurse completed assessment on a new patient after she received a medication list from an EMT. She/he is going to retrive critical patient's information from the medical chart to fill out SBAR form with an ER pharmacist in the nurse station. When SBAR form is completed, a nurse reports to a resident physician regarding the new patient using SBAR.			
Participant Status	**Desired learner actions & Triggers to move to next state**		
	Triggers:	**Learner Actions**	**Debriefing points**
Nurse Pharmacist		Complete SBAR form as a team before giving a report. Pharmacist suggests to be carful about antibiotics due to CKD.	Make sure pharmacists suggestion/recommendation is shared.
Resident physician (MD)	Nurse calls and asks to meet in the nurse station to give a report.	Walks into the nurse station and sits on a chair to receive a report.	
Nurse		Reports to the physician using SBAR	Identifies critical information; includes pharmacist suggestion/ recommendation
Resident physician (MD)		Take memo when he/she receives a report Ask questions if there are any.	Critical information was given and received with no gap between nurse and physician; make sure critical information was shared
Scenario ends: 7 minutes or when leaner completed a report using SBAR			

Case Flow/Trigers/Scenario Development States			
Initiation of Scenario: Part 2: The patient was diagnosed UTI. The resident prescribed antibiotic IV and gave the order to the nurse without say anything and walked away. An ER pharmacist is ready to prepare IV medication.			
Participant Status	**Desired learner actions & Triggers to move to next state**		
	Triggers:	**Learner Actions**	**Debriefing points**
Nurse		Receives and looks at the order.	
Pharmacist	Asks nurse about the order.	Show the order sheet.	
Nurse		Asks pharmacist if this is the correct dose for Unasyn.	If nurse does not ask about dose, what is the assumption?
Pharmacist		Suggest the correct dose and explain why.	If nurse does not ask, what information should pharmacist give?
Nurse		Calls physician to clarify the order.	Stress importance of nurse's proactive action.
Physician	Answers the phone but just tells the nurse to do what's on the order and hangs up on		What emotions or behaviors were triggered? How should they be handled?
Nurse		Use 2 challenge rule	Factors influencing decision to follow through.
Physician	Answer the phone but not friedly	Stay calm	
Nurse		Clarifies the order with the physician and suggests changing the Unasyn dose.	
Physician	Changes the order and states the correct dose the nurse.		
Nurse		Repeats back the new order to the physician and thanks him.	What action should be taken to confirm the new order if it is not done in the call?
Nurse		Notifies the pharmacist that the order has changed.	
Pharmacist		Receives and confirms (closed-loop) the new order.	How could the order be confirmed in absence of the closed loop?
Scenario ends: 7 minutes or when leaner resolved the issue and confirmed the new order			

Scenario A : Communication Assessment Sheet

Part I

1. Utilize available resources to obtain patient information

☐ Medical history

☐ Allergy

☐ Current vitals/condition (BP, temperature)

2. Share specific information with team members

☐ Situation (fever)

☐ Background

- Hx: HT, UTI, CKD but no dialysis
- NKA
- Amlodipine (Norvasc) , Acetaminophen

☐ Assessment

- BP is controlled
- Last dose and time of Acetaminophen due to fever

☐ Recommendation (CKD-careful about antibiotic)

Part II

☐ Consult with a pharmacist about the medication order (dosage & Hx)

☐ Clarify the medication order with an ordering physician (dosage & Hx)

☐ Use the 2-challenge rule

☐ Use check-back to verify information

☐ Use closed loop communication (with a pharmacist)

Scenario B: Situational Awareness

Finding Errors

Nurses, Physicians & Pharmacists (clinicians)

Goal: Demonstrate situational assessment related patient safety human factors
Specific Learning Objectives
1) Identify the 10 hazards/errors in the patient room as a team. 2) Demonstrate how to remove hazards/correct errors to make a safe environment. 3) Identify risks associated with handoffs and mitigating actions.

Target Learners: physicians, nurses, & pharmacists who practice in the clinical settings

Total Time: 35 minutes
Orientation Time: 5 minutes
Scenario Time: 6 minutes
Debriefing Time: 20 minutes

Evidence Based/References:

Farnan, J. M. (2016). Situational awareness and patient safety. Patient Safety Network. Retrieved from https://psnet.ahrq.gov/webmm/case/372/situationalawareness-and-patientsafety

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Van Der Like, J., Downing Jr., C.O., Davis, K., Smith-Peters, C., & Vodanovich, S. (2018). Interprofessional Collaborative Approach for Improving Situation Awareness Using Simulation in a Nursing Residency Program

"The 60 Second Situational Assessment" Author: Deborah Struth, MSN, RN (June 25, 2009/QSEN institute)

Orientation (5 minutes):

- Review objectives of the scenario
- Explain the length of the scenario and how scenario will end
- Explain debriefing immediately follows the scenario. Time: 20 minutes
- Describe each role and responsibility (patient, facilitator, peer evaluator, and scriber)
- Explain the physical environment (e.g. room setup)
- Explain available equipment (warn if there is any physically harmful item such as a syringe with needle)
- Provide patient details, setting and learner's tasks.
- Give an opportunity for questions

SCENARIO SCRIPT

Case Summary:

A 60-year-old male fell from a mango tree. He was brought by his wife to the ER suffering from a mild concussion and complaining about pain in his right ankle. All assessments are complete (no neurological deficits; no leg fractures; alert and oriented x 5. VS normal). Patient has a history of diabetes and is a smoker. His glucose level is normal. Allergies: Cefoxitin (Rocefin). The patient was transferred to an observational unit from ER while waiting for his head CT result.

Scenario Cast/Role:

Cast	Role
Patient (SP)	Confederate, facilitator (#1) lying on the bed
Physician	Learner, completes the task
Nurse	Learner, completes the task
Pharmacist	Learner, completes the task
Peer evaluators (from other group)	Assess using checklist
Facilitator (#2)	Timekeeper, Assess using checklist

Scribe is one learner from the group

Scenario Setting:

- Observational unit

Room setting (equipment/environment):

1) No wristband ID
2) Oxygen is NOT running, but nasal cannula on the patient
3) Pulse oximeter on the patient's finger & shows 92%
4) D5W is running TKO
5) NS is hanging, but NOT connected to the patient
6) Wrong patient antibiotic Rocefin is hanging, but not connected
   (JOE KOSAKA, DOB: March 2, 1995, ID:0302)
7) No side rails up
8) No call light
9) Insulin syringe with needle (capped) on the bed
10) Candies in the patient's hand
11) A cigarette pack in the pocket of the patient's gown

- Put a correct patient name, DOB and ID wristband on the bedside table
  (JOE OSAKA, DOB: February 3, 1959, ID: 0203)

- The patient's chart (EHR) is available at the bedside laptop.
- 1 White board (list the problems)
- 2 different colored pens for the board (each group)

Learner's Task:

- Focus on patient safety and identify 10 hazards in the room.
- Communicate with team members about the errors found.
- One of the group members will list all the identified errors on the white board.
- Fix the issues/errors, if possible.
- Communicate with the patient (see script page).
- Total 6 minutes (3 minutes each group) to complete the task.

Scenario End Points:

- When 6 minutes is up (3 minutes each group), or
- All 10 errors identified (learner objectives met)

Critical Learner Actions:

- Identify the right patient using at least 2 methods (Full name & DOB/ID#) to verify identity.
- Check orders (oxygen-flow rate, IV-medication, dose, route & time, allergies) with patient's name and DOB/ID.
- Stop D5 IV .
- Remove wrong IV (Rocefin) from the IV pole.
- Connect NS IV TKO.
- Check SPO2 and change O2 flow rate to 2 L (ordered rate).
- Put both side rails up.
- Put call light within reach.
- Remove insulin syringe from the bed.
- Remove candies and explain the reason to the patient.
- Remove the cigarette pack from the pocket of patient's gown and explain the reason.
- Communicate effectively with team members & patient.

Physician Order Sheet and Progress Record

Patient Name: JOE OSAKA
Date of Birth:
February 3, 1959 60 years
ID #0203 Allergy: Ceftriaxone

Date/Time	
1/1/18 15:30	A 60-year-old male fell from a mango tree and was brought to the ER by his wife. Patient complained about mild headache and right ankle pain. Alert and oriented x 5. Mild concussion. No neurological deficit. Mild swelling and tenderness to right ankle BP: 120/60mmHg HR: 70 RR: 12 T: 36.8c SPO2: 93% Hx: Diabetic (type 2) and smoker. BS: 80mg/dl <u>Order (ER)</u> Head CT x-ray on right ankle Patient transfers to an observational unit while waiting for CT result. No fracture on right ankle. <u>Order (observational unit)</u> • VS q4h • Neuro check q1h • O2 2L NC when SPO2 <95% • IV NS 500ml TKO
16:30	

Case Flow/Trigers/Scenario Development States			
Initiation of Scenario: Nurse, Physician, and Pharmacist who came in to the evening shift walk in to the patient room in the observational unit. One of the groups (A) is going to be in the room to start the scenario.			
Participant Status	**Desired learner actions & Triggers to move to next state**		
	Triggers:	**Learner Actions**	**Debriefing points**
Group A Nurse Physician Pharmacist		Introduce themselves and one of the learners asks patient's name, DOB.	What's the important first ation upon entering the patient room?
Group A Nurse Physician Pharmacist		Communicate as a team and start finding issues in the room. One of the learners lists the errors on the white board.	What issues arise if there is inadequate communication?
Group A Nurse Physician Pharmacist		Keep communicating with the patient and team members.	
	3 minutes is up	Group B learners take over from group A learners.	
Group B Nurse Physician Pharmacist		Communicate as a team and with patient; continue finding issues in the room until all errors identified. One of the learners lists errors on the white board	Discuss importance of taking into account the bigger picture and team communication while doing specific tasks. Why do these errors occur and how can we mitigate risk during handoff?
Scenario ends: 6 minutes or when learners have identified 10 errors & fixed them (met objectives)			
When the Group A is performing a scenario, Group B observes. 2 peer evaluators use a checklist.			

Suggestions to <u>decrease</u> complexity:

- Fewer hazards/errors
- Provide correct items at the bedside (give hints)
- Simple tasks which do not require clinical knowledge, experience & critical thinking skills

Suggestions to <u>increase</u> complexity:

- Add hazards/errors that require critical thinking skills, clinical knowledge and experience
  (e.g. the patient has a leg fracture and receives Morphine but there is no BVM nor saturation monitor in the room)

Scenario B: Situational Awareness (Finding Error)

Assessment sheet

Right Patient

_____Wrist band: Name verified with patient, DOB & ID#

at least 2 methods (Full name & DOB/ID#)

Oxygen

_____ Source – flow rate_____, ordered flow rate_____

Appropriate equipment (nasal, mask or non-rebreather)

Hazard around O2?

IV's

_____Follow tubing to solution – check connections_____, label_____

_____Solution/Medication

Correct patient's name, drug_____, time_____, dose_____, route_____

Compare all the above to MAR

_____Allergy?

Environment

_____ Side rails up

_____ Call light within reach

_____ Insulin syringe

_____ Candies

_____ Cigarette box

Any other things that could harm the patient?

_____

_____

Patient Script		
	Learner's action	**SP's action/script**
	No communication with patient	Are you folks are changing shift? I Just came from ER. I'm Joe. You are...
Wristband ID	Don't check	
	Check the band and ask name	I'm Joe
	Ask full name	Joe Osaka
	Ask date of birth	2/3/1959
O2	Don't check	I don't feel anything on my nose
	Start O2	Oh, now I feel air. I can breath better!
IV	Don't check IV	What medication am I getting?
	Ask allergy	I'm allergic to some kind of antibiotics
Environment	Don't check side rails	Put one of the legs out from the gurney
	Don't check call light	When I need your help, what should I do?
	Don't check candies, syringe, and/or cigarret box	open up a sheet a little bit to be able to see
	Find a cigarette box- not safe to have a cigarette in a hospital	Oh! Sorry. I don't want my wife to take it away, so I need to keep it on me.
	Find candies -should not have because diabetic	Sometime I'm craving for candies!

Appendix E

Gap Analysis

Current practice	Recommended Action Plan	Desired practice
Mandatory twice a year patient safety trainings at individual hospital is lecture based training and adverse events are keep increasing	Provide a patient safety educational program for healthcare educators who are willing to be a safety champion and teach non lecture based (simulation-based) safety training in an unit/department	≥70% of clinical educators can provide effective and efficient competency based patient safety unit training
Japanese healthcare professionals' attitudes toward Physician-Nurse collaboration is not positive	Provide basic interprofessional education for healthcare educators	≥70% of healthcare educators promote their interprofessional collaboration in their practice
Although healthcare educators take a simulation faculty development course, many of them don't have opportunities to teach or don't have support as a facilitator when they go back to their organization	Provide an opportunity to teach and follow up sessions at 3 months and 6 months after intervention to support educators	≥70% of healthcare educators feel comfortable/somewhat confident facilitating safety training using simulation at their own institution by 6 months after intervention

Appendix F

Gantt Chart

	2018				2019											
Project Tasks & Important Dates:	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Plan																
Submit proposal of project/Prospectus		1 2														
IRB certificate																
Gantt Chart																
WBS																
Gap analysis																
Responsibility/Communication plan																
SWOT analysis																
Proposed budget																
Evaluation table																
Purpose																
Target participants																
Implement Dates/Location/Room reservation																
Decide facilitators																
Draft program agenda																
Create/distribute flyer & promote																
Develop needs assessment survey																
Distribute & Collect needs assessment survey																
Develop participants demographic survey																
Develop project consent																
Upload online assessment & surveys																
Content																
Goals & Objectives																
Evidence/Literature Review																
Decide instructional methods																
Design scenarios & Alpha/Beta test (validate)																
Sim Orientation/Facilitation/Debriefing plan																
E-learning knowledge assessment cases																
Self-assessment tool translation and validation																
Final Agenda																
Lecture slides/course materials																

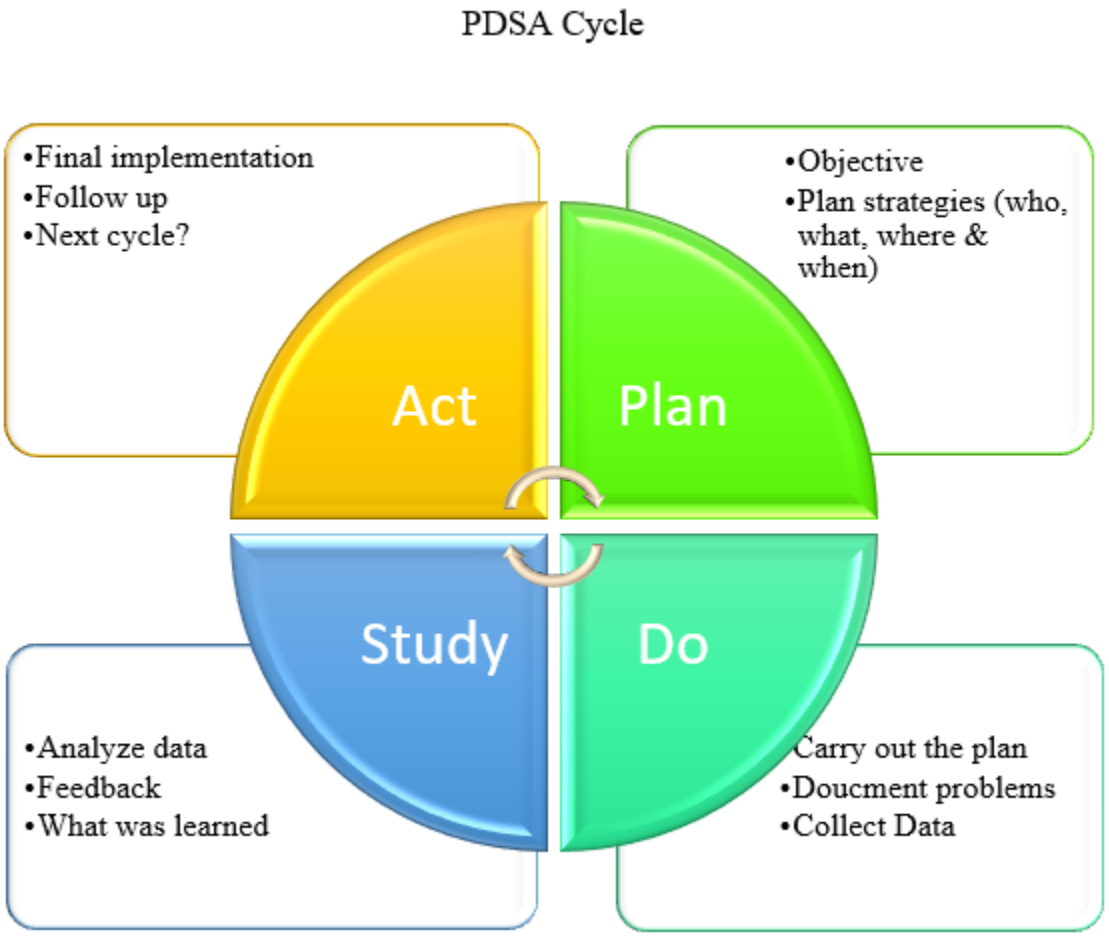
	2018				2019											
Intervention/Session	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Distribute demographic survey																
Pre self-assessment																
Distribute project consent																
Intervention																
Evaluation/Follow up																
Immediate post self-assessment																
Program evaluation																
3 months post intervention video conf																
6 months post intervention video conf & assessment																
Data Collection																
Data Analysis																
Write draft																
Paper due																
Presentation																

Color Key

Milestone

Appendix G

CQI method and Data Collection Tools (Moodle)



Step 1: Plan: Set the goal and objectives, develop an educational plan based on needs assessment, gap analysis, and issues which was identified in those process.

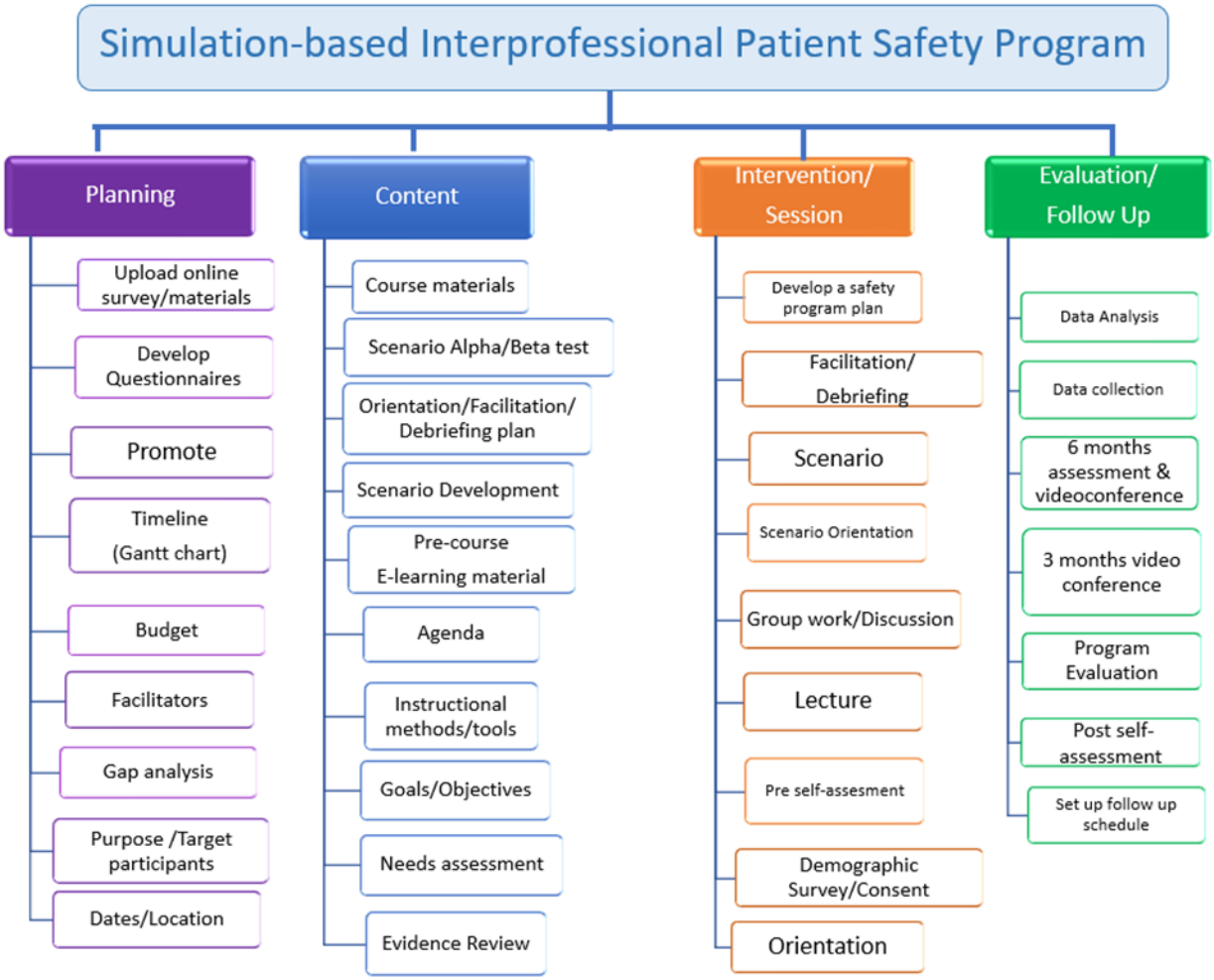
Step 2: Do: Conduct a program and reflect and document what went well and what needs to be improved.

Step 3: Study: Analyze the data from individual assessment (self-assessment tool, SAQ, SET-M) and program evaluations.

Step 4: Act: Make some changes based on the program which was conducted in step 2 "Do" and data (achievement of objectives and feedback from stakeholders) from step 3 "study". Make a plan for the next program.

Appendix H

Work Breakdown Structure (WBS)



Appendix I

SWOT Analysis

	Strengths	Weaknesses
Internal	• 2 out of 4 facilitators (physician & nurse) are Certified Healthcare Simulation Educators • 2 other facilitators have strong simulation education, patient safety background and teaching experience in Japan • Multi-professional facilitators (Physician, nurses & pharmacist) • High faculty to learner ratio • Follow up group mentorship • Sim Center is accredited by the Society of Simulation in Healthcare (SSH)	• Limited participants (up to 24 people at one site) due to space & limited facilitators • No financial support • High facilitator's fee & travel expenses • Lack of available financial data from Japan on cost of medical adverse events or savings from safety improvements
	Opportunity	**Threats**
External	• Sim-based interprofessional & patient safety program for educators are not offered in Japan • Very limited institutions offer simulation-based education programs for educators in the Asian countries • Collaboration with other simulation centers as well as hospitals • More teaching opportunities in Japan • Many institutions and organizations are looking for resources in simulation-based healthcare education	• Challenges in recruiting participants in Japan • Program fee $273/¥30,000 considers expensive for some Japanese healthcare educators • Some participants will be supported financially by their employer but not always

Appendix J

Project Budget

REVENUE	Initial inplementation	
$1=¥ 110	¥ YEN	$ US
Course fee ¥30,000 $273/person x 47	¥1,410,000	**$12,831**

	EXPENSES	Initial Implementation	
	$1=¥110	¥ YEN	$ US
A	**PERSONNEL**		
	DNP student (waived)	0	$0
	Physicians ¥ 200,000: US + ¥ 100,000: JP 2nd & 3rd year: only JP	300,000	$2,727
	RNs ¥ 80,000 x 2 2nd & 3rd year: 1 RN	160,000	$1,455
	Pharmacist	90,000	$818
	Epidemiologist/Statistician	50,000	$455
	Tax (10%)	60,000	$546
	A Total	¥ 660,000	**$6,000**
B	**OPERATING**		
	Lunch (participants & facilitators)	101,100	$919
	Course materials & supplies	31,126	$283
	Meeting, meals & misc	127,702	$1,161
	Facility fee	0	$0
	B Total	¥259,928	**$2,363**
C	**TRAVEL**		
	Transportation	163,014	$1,482
	Accomodation	155,242	$1,411
	C Total	¥318,256	**$2,893**
D	**OTHER COST**		
	Credit card fee (4%)	19,200	$175
	Income Tax (8%)	112,800	$1,026
	D Total	¥132,000	**$1,200**
	TOTAL EXPENSES **1 day x 2 workshops**	¥1,370,184	**$12,456**

Appendix K

Cost Avoidance and ROI for Medication Error

Medication Error

% of reduction	# of errors	Cost Avoidance	ROI
1%	12	$182,134	19%
5%	60	$947,926	101%
10%	120	$1,905,166	203%

Cost avoidance: ($15,954/error) (# of errors) – $9314 (expenses)

1%: 15,954 x 12 - 9314 = 182,134

5%: 15,954 x 60 – 9314 = 947,926

10%: 15,954 x 120 – 9314 = 1,905,166

ROI: **Savings – Expenses/Expenses**

1%: 182,134-9314/9314 = 18.6%

5%: 947,926-9314/9314 = 100.8%

10%: 1,905,166-9314/9314 = 203%

Appendix L

Cost avoidance and ROI for RN Turnover

RN Turnover

% of reduction	# of turnover	Cost Avoidance	ROI
10%	12	$182,686	19%
15%	18	$278,686	29%
20%	24	$374,686	39%

Cost avoidance: ($16,000/error) (# of errors) – $9314 (expenses)

10%: 16,000 x 12 – 9314= 182,686

15%: 16,000 x 18 - 9314 = 278,686

20%: 16,000 x 24 – 9314= 374,686

ROI: **Savings – Expenses/Expenses**

10%: 182,686 – 9314/9314 = 19%

15%: 278,686 – 9314/9314 = 29%

20%: 374,686 – 9314/9314 = 39%

Appendix M

Responsibility/Communication Matrix

Task	DNP student	RN facilitator	RN SafetyExpert	MD facilitator 1	MD facilitator 2	Pharm facilitator
Plan						
Room reservation (2 locations)		R*				R**
Course Registration (2 locations)	R	A				
Order lunch (2 locations)		R*				R**
Budget	R			A		
Create flyer	R					
Distribute flyer & promote	R	A				A
Develop needs assessment survey	R	A	A			A
Distribute/Collect needs assessment	R		A			
Develop participant's demographic survey	R	A	A			
Develop project consent	R					
Upload online assessment & surveys	A		R			
Print Certificates	A	R				
Content						
Goals & Objectives	R	A		A	A	A
Evidence/Literature review	R					
Decide instructional methods	R	A		A	A	A
Design scenarios & alpha/beta test (validate)	R	A		A		
Orientation/Facilitation/Debriefing plan	R	A		A	A	A
E-learning assessment cases	A		R			
Self-assessment tool translation and validation	R	A	A			
Agenda	R	A		A	A	A
Lecture slides/course materials	R	A		A	A	A

Session						
Administer demographic survey (online)	R					
Pre self-assessment	R					
Explain/Distribute project consent	R					
Intervention	R					
Course Orientation	R					
Lecture	R	A		A	A	A
Simulation orientation	R	A				
Simulation Facilitation	R	A		A	A	
Debriefing	R	A		A	A	
Group discussion/work facilitation	R	A		A	A	A
Evaluation/Follow up						
Immediate post-self assessment (online)	R					
Program evaluation (online)	R					
3 months post intervention video conference & assessment	R	A		A	A	A
6 months post intervention video conference & assessment	R	A		A	A	A
Data collection	R		A			
Data analysis	R		A			
Set up follow up schedule	R					

Color Key

R: Responsible

A: Assist

US facilitator

JP facilitator

* Aichi Medical University

** Kinki University

Appendix N

Self-Assessment & Reflection

Please rate your sense of your own level of proficiency in the following areas

1 VeryLow: Don't know anything about the topic
2 Low: Know/address very little about this topic
3 Moderate: Know/address this topic fairly well but there are more things to learn
4 High: Have good knowledge/comfortable but there are things to learn
5 Very high: Know/confident almost everything about this topic

	Pre					Immediate Post					3 months					6 months				
Patient Safety	1:Very low	2: Low	3: Moderate	4:High	5:Very high	1:Very low	2: Low	3: Moderate	4:High	5:Very high	1:Very low	2: Low	3: Moderate	4:High	5:Very high	1:Very low	2: Low	3: Moderate	4:High	5:Very high
Apply the concept of "just culture" to patient safety cases																				
Demonstrate situational assessment related patient safety factors																				
Simulation																				
Utilize simulation-methods to teach patient safety																				
Acquire basic facilitation and debriefing techniques																				
Describe characteristics of the simulation observational assessment tool																				
IPC & Communication																				
Report critical patient information with other team members using structured method (SBAR)																				
Use effective communication methods to exress concerns and challenge one another in a case of potential harm to a patient (2 challenge rule)																				
Develop educational program & leadership																				
Develop a plan of simulation session for pateint safety																				
Implement the patient safety simulation session																				
Promote safety culture as a safety champion																				

Appendix O

Safety Attitude Questionnaire (SAQ)

Likert scale: 1 = disagree strongly, 2 = disagree slightly, 3 = neutral,

4 = agree slightly, 5 = agree strongly

Teamwork climate

1. It is easy for personnel in this unit/department to ask questions when there is something that they do not understand.
2. I have the support I need from other personnel to care for patients.
3. Nurse input is well received in this unit/department.
4. In this unit/department, it is difficult to speak up if I perceive a problem with patient care.
5. Disagreements in this unit/department are resolved appropriately (i.e., not who is right, but what is best for the patient)
6. The physicians and nurses here work together as a well-coordinated team.

Safety climate

1. The culture in this unit/department makes it easy to learn from the errors of others.
2. Medical errors are handled appropriately in this unit/department.
3. I know the proper channels to direct questions regarding patient safety in this unit/department.
4. I am encouraged by my colleagues to report any patient safety concerns I may have
5. I receive appropriate feedback about my performance.
6. I would feel safe being treated here as a patient.
7. In this unit/department, it is difficult to discuss errors.

Job satisfaction

1. This hospital is a good place to work.
2. I am proud to work at this hospital.
3. Working in this hospital is like being part of a large family.
4. Moral in this unit/department area is high.
5. I like my job.

Stress recognition

1. When my workload becomes excessive, my performance is impaired.
2. I am more likely to make errors in tense or hostile situations.
3. Fatigue impairs my performance during emergency situations (e.g., emergency resuscitation, seizure).
4. I am less effective at work when fatigued.

Perceptions of management

1. Hospital management does not knowingly compromise the safety of patients.
2. Hospital administration supports my daily efforts.
3. I am provided with adequate, timely information about events in the hospital that might affect my work.
4. The levels of staffing in this clinical area are sufficient to handle the number of patients

Working conditions

1. All the necessary information for diagnostic and therapeutic decisions is routinely available to me.
2. This hospital constructively deals with problem physicians and employees.
3. Trainees in my discipline are adequately supervised.
4. This hospital does a good job of training new personnel.

Appendix P

Simulation Effectiveness Tool – Modified (SET-M)

Simulation Effectiveness Tool - Modified (SET-M)

After completing a simulated clinical experience, please respond to the following statements by circling your response.

PREBRIEFING:	**Strongly Agree**	**Somewhat Agree**	**Do Not Agree**
Prebriefing increased my confidence	3	2	1
Prebriefing was beneficial to my learning.	3	2	1
SCENARIO:			
I am better prepared to respond to changes in my patient's condition.	3	2	1
I developed a better understanding of the pathophysiology.	3	2	1
I am more confident of my nursing assessment skills.	3	2	1
I felt empowered to make clinical decisions.	3	2	1
I developed a better understanding of medications. (Leave blank if no medications in scenario)	3	2	1
I had the opportunity to practice my clinical decision making skills.	3	2	1
I am more confident in my ability to prioritize care and interventions	3	2	1
I am more confident in communicating with my patient.	3	2	1
I am more confident in my ability to teach patients about their illness and interventions.	3	2	1
I am more confident in my ability to report information to health care team.	3	2	1
I am more confident in providing interventions that foster patient safety.	3	2	1
I am more confident in using evidence-based practice to provide nursing care.	3	2	1
DEBRIEFING:			
Debriefing contributed to my learning.	3	2	1
Debriefing allowed me to verbalize my feelings before focusing on the scenario	3	2	1
Debriefing was valuable in helping me improve my clinical judgment.	3	2	1
Debriefing provided opportunities to self-reflect on my performance during simulation.	3	2	1
Debriefing was a constructive evaluation of the simulation.	3	2	1
What else would you like to say about today's simulated clinical experience?			

Leighton, K., Ravert, P., Mudra, V., & Macintosh, C. (2015). Update the Simulation Effectiveness Tool: Item modifications and reevaluation of psychometric properties. *Nursing Education Perspectives, 36*(5), 317-323. Doi: 10.5480/1 5-1671.

Appendix Q

Post Program Evaluation

Immediately Post Program Evaluation					
	5: Strongly agree	4: Agree	3: Neutral	2: Disagree	1: Strongly disagree
The workshop objectives were identified and met					
The facilitators were knowledgeable about the subject matter					
The workshop met my expectations and my needs					
Workshop materials were useful/helpful					
The facilitators used a variety of instructional methods					
I would recommend the workshop to co-workers					
I will be able to use knowledge and skills gained from this workshop					
The classroom environment was comfortable (e.g. room temperature, seating)					
The online pre-workshop e-learning materials were useful					
The length of the workshop was appropriate to the content of the training					

How could this program be improved?

Any comments?

Appendix R

6 Months Post Program Evaluation

6 Months Post Program Evaluation						
		5:Strongly Agree	4: Agree	3: Neutral	2:Disagree	1:Strongly Disagree
1	The entire program met my expectations and my needs					
2	Follow up videoconference at 3 months & 6 months were helpful					
3	Would you recommend this program to other healthcare professionals/educators?					
4	I feel my attitude toward patient safety became positive after I took this program					

5 How many times did you facilitate a simulation-based patient safety program after you took this program?

0 1 2 3 or more

6 Has your participation in the patient safety workshop improved your competency in areas of your professional role as clinical educator?

7 What specific knowledge, skills, or experience did you gain/obtain from this workshop?

8 How has your participation in the patient safety workshop (develop and taugh a safety program) impacted your confidence to be a safey champion?

Other comments:

Appendix S

In-facility Safety Training Evaluation

Please rate the safety training session you have just attended.

Facilitator(s) : _____

	Course/Session	5 : Strongly Agree	4 : Agree	3 : Nutral	2 : Disagree	1 : Strongly Disagree
1	The course met my needs and expectations					
2	I will be able to use the knowledge and skills gained from this course					
3	The training objective were identified and meet					
4	Class materials were helpful					
5	The instructor used a variety of instructional methods (e.g., lecture, discussion, & activities)					
6	The instructor was knowledgeable about the subject matter					
7	The time allocated was appropriate to the content of the training					
8	The physical classroom environment was comfortable (e.g., room temperature and light)					
9	I would recommend this training to other co-workers					
	Simulation					
10	Prebriefing increased my confidence					
11	I am more confident in promoting patient safety					
12	Debriefing contributed to my learning					
13	Debriefing provide opportunities to self-reflect on my performance during simulation					
	Patient Safety					
14	I developed a better understanding of patient safety knowledge, skill, and behavior					

Comments:

Appendix T

Statement of Non-Research Determination Form / IRB Approval

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

DNP Statement of Non-Research Determination Form

Student Name: Mari Nowicki

Title of Project:
Simulation-based Patient Safety Training Program

Brief Description of Project:

A) Aim Statement:
The objective of this project is to conduct and evaluate a simulation-based patient safety training for multi-professional clinical educators to enhance patient safety competencies and become patient safety champions.

B) Description of Intervention:
The simulation-based patient safety training is a one-day program for multi-professional clinical educators who work in hospitals in Japan. The conceptual framework is based on adult learning theory and the Kirkpatrick evaluation model. The training approach is a combination of didactic, small group work, group discussion, and fundamental simulation instructional methods will be used. The participants will complete online anonymous questionnaires to obtain demographic data, previous patient safety training and experiences relevant to the program, self-assessment of deficiencies and learning needs in patient safety, and previous simulation learning or teaching experiences. A baseline for participant's existing knowledge, skills, and attitudes will be established through use of an assessment tool in an e-learning module developed by a patient safety, instructional design, and simulation expert nursing faculty in Japan. The participant will retake the immediate post-course assessment to measure the change in their patient safety knowledge, skills, and attitudes and take a post-course evaluation questionnaire. In order to engage in their role upon completion of the training, the new safety champions will conduct a session for the clinical staff in their unit within six months. Follow up videoconferences led by one of the original facilitators, will be held at three and six months after completion of the intervention to support the participants (safety champions). These videoconferences at three and six months after program completion will include the assessment of patient safety knowledge, skills, and attitudes that were administered pre and immediately post-intervention in order to gauge retention.
The funds for the program are covered by the program fee charged to the participating hospitals. The training programs will take place from January 2019 to February 2019.

C) How will this intervention change practice?
Patient safety training for multi-professional clinical educators through simulation-based education is a new approach in Japan with the potential to bridge the gap

between the lack of patient safety education for healthcare providers and clinical practices necessary to reduce patient adverse events during hospitalization.

D) Outcome measurements:
1. Clinical educator's patient safety knowledge, skills and attitude
2. Whether the clinical educators facilitated patient safety programs after intervention

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)

☒ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

☐ This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**X**	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.	**X**	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	**X**	

The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**X**	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	**X**	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	**X**	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print):

____Mari Nowicki_____

Signature of Student:

DATE 8/22/2018

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print):

_____

Signature of Supervising Faculty Member (Chair):

_____DATE_____

IRB University of Hawaii

HS

jkowalsk@hawaii.edu on behalf of Human Studies Program 2 Tue 8/21

Re: Inquiry about QI/patient safety project

Follow up. Start by Tuesday, August 21, 2018. Due by Tuesday, August 21, 2018.
You forwarded this message on 8/21/2018 2:20 PM.

Mari Nowicki, Dr. Berg,

I am writing regarding your inquiry, as to whether IRB review is necessary for your proposed project under the above referenced title to the Human Studies Program for review. Based on your description, we have determined your project to be not human subjects research. As such, the project does not qualify as exempt or non-exempt research, and it does not require review and approval by the Human Studies Program or a UH Institutional Review Board (IRB).

To qualify as human subjects research, as defined by federal regulation, a project must meet the following standards:

- It must qualify as a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. The generalizable knowledge test applies when a project is designed to answer a research question, to draw conclusions about a specific premise or hypothesis, or to apply study results beyond the specific focus of the research. Study results that will be published in a scholarly journal, book, or online; placed in a library (such as a masters or doctoral dissertation) or presented at an academic meeting are considered to be generalizable.

- Also, the project must involve obtaining information about living individuals by:
    - Obtaining information through intervention or interaction with these individuals, or
    - Accessing private information from which individuals can be identified directly or indirectly through a link or code. This includes accessing existing private data that identifies individuals even if these individuals will not be contacted in your project.

Please call our office at 808.956.5007 or email us at uhirb@hawaii.edu if you have any questions.

Respectfully,

Jacob Kowalski, CIP
IRB Coordinator
UH Human Studies Program

Letter of Support from Simulation Center/University of Hawaii

UNIVERSITY OF HAWAI'I AT MĀNOA
Telehealth Research Institute
John A. Burns School of Medicine

Benjamin W. Berg, MD, CHSE
SimTiki Simulation Center
John A. Burns School of Medicine
University of Hawaii
651 Ilalo St.
Honolulu, HI 96813

August 12, 2018

Dear Dr. KT Waxman,

This is a letter to support for Mari Nowicki to implement her DNP Comprehensive Project at SimTiki Simulation Center, John A. Burns School of Medicine at University of Hawaii. We give her permission to use the name of our agency in her DNP Comprehensive Project Paper and in future presentations and publications.

Sincerely,

Benjamin W Berg, MD, CHSE
Professor of Medicine
Director of Simulation

Appendix U

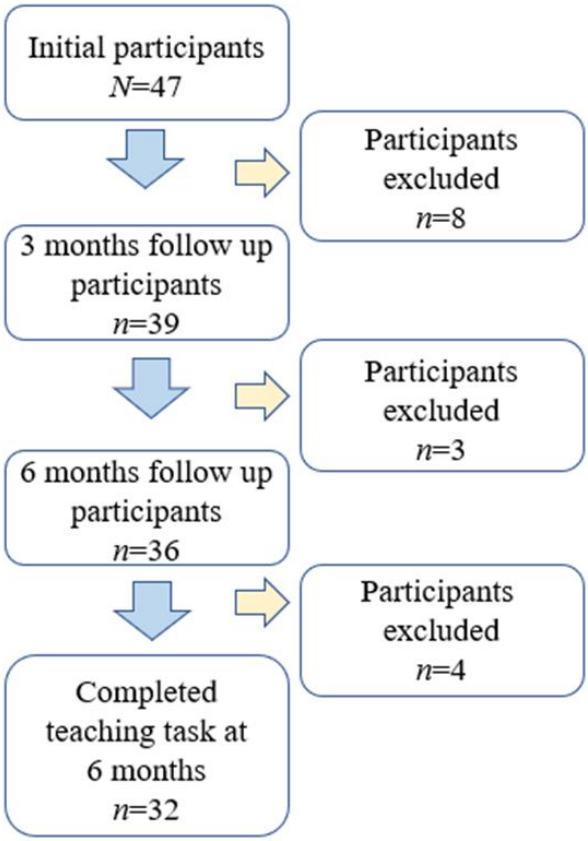
Demographic characteristics

	n	%
Gender		
Male	21	44.7
Female	26	55.3
Age		
≤29 years old	2	4
30-39	15	32
40-49	22	47
50-59	8	17
Education		
Diploma	15	32
2-4 Year College	9	19
Master's degree	8	17
Doctorate degree	8	17
Medical School	7	15
Occupation		
Physician	7	15
Nurse	27	57
Pharmacist	11	23
Other (medical enginier)	2	4.1
Speciality		
Internal medicine	6	14
Critical Care (ICU/ER/Surgery/OR)	23	49
Pediatric	2	4.5
Home health	2	4.5
Other (school, patient safety management, research)	13	28

	n	%
Type of hospital		
≥500 beds teaching hospital	32	68.1
<500 beds teaching hospital	11	23.4
<500 beds not teaching hospital	4	8.5
Years of clinical experience		
<10 years	11	23
10-14 years	12	26
15-19	6	13
20-24	9	19
≥25	9	19
Roles		
Director/Manager	16	34
Clinical Educator/preceptor	17	36
Educator at academic setting	14	30
Experience teaching patient safety		
Yes	17	36
No	30	64
Expereince in teaching interprofessional education		
Yes	18	38
No	29	62
Experience in teaching using simulation		
Yes	30	64
No	17	36

Appendix V

Intervention Process Flowchart

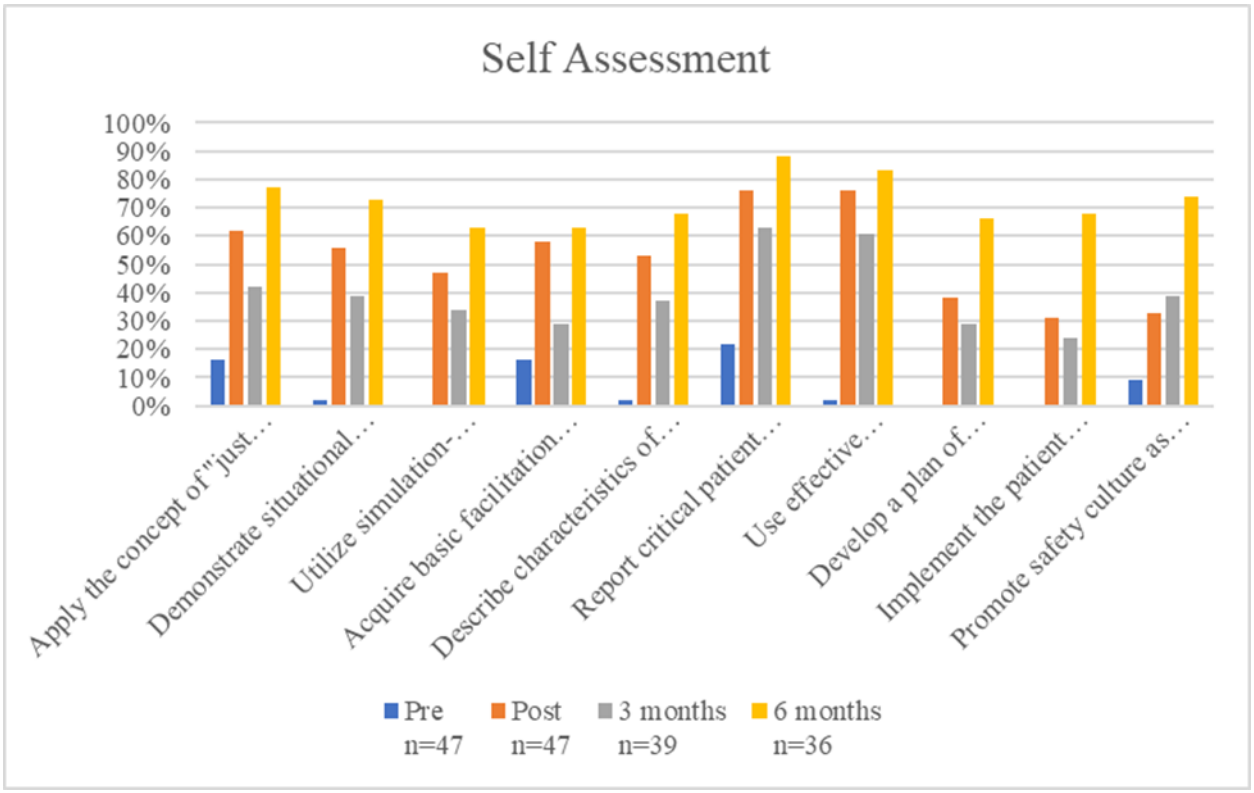


Appendix W

Self-Assessment & Reflection Results

(Mean percent positive scores "Agree" and "Strongly Agree" responses on the survey's five-point Likert scale)

Program Objectives	Pre *n*=47	Post *n*=47	3 months *n*=39	6 months *n*=36
Apply the concept of "just culture" to patient safety cases	16%	62%	42%	77%
Demonstrate situational assessment related patient safety factors	2%	56%	39%	73%
Utilize simulation-methods to teach patient safety	0%	47%	34%	63%
Acquire basic facilitation and debriefing techniques	16%	58%	29%	63%
Describe characteristics of the simulation observational assessment tool	2%	53%	37%	68%
Report critical patient information with other team members using structured method (SBAR)	22%	76%	63%	88%
Use effective communication methods to express concerns and challenge one another in a case of potential harm to a patient (2 challenge rule)	2%	76%	61%	83%
Develop a plan of simulation session for patient safety	0%	38%	29%	66%
Implement the patient safety simulation session	0%	31%	24%	68%
Promote safety culture as a safety champion	9%	33%	39%	74%


Self Assessment
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Apply the concept of "just…
Demonstrate situational…
Utilize simulation-…
Acquire basic facilitation…
Describe characteristics of…
Report critical patient…
Use effective…
Develop a plan of…
Implement the patient…
Promote safety culture as…
Pre n=47
Post n=47
3 months n=39
6 months n=36

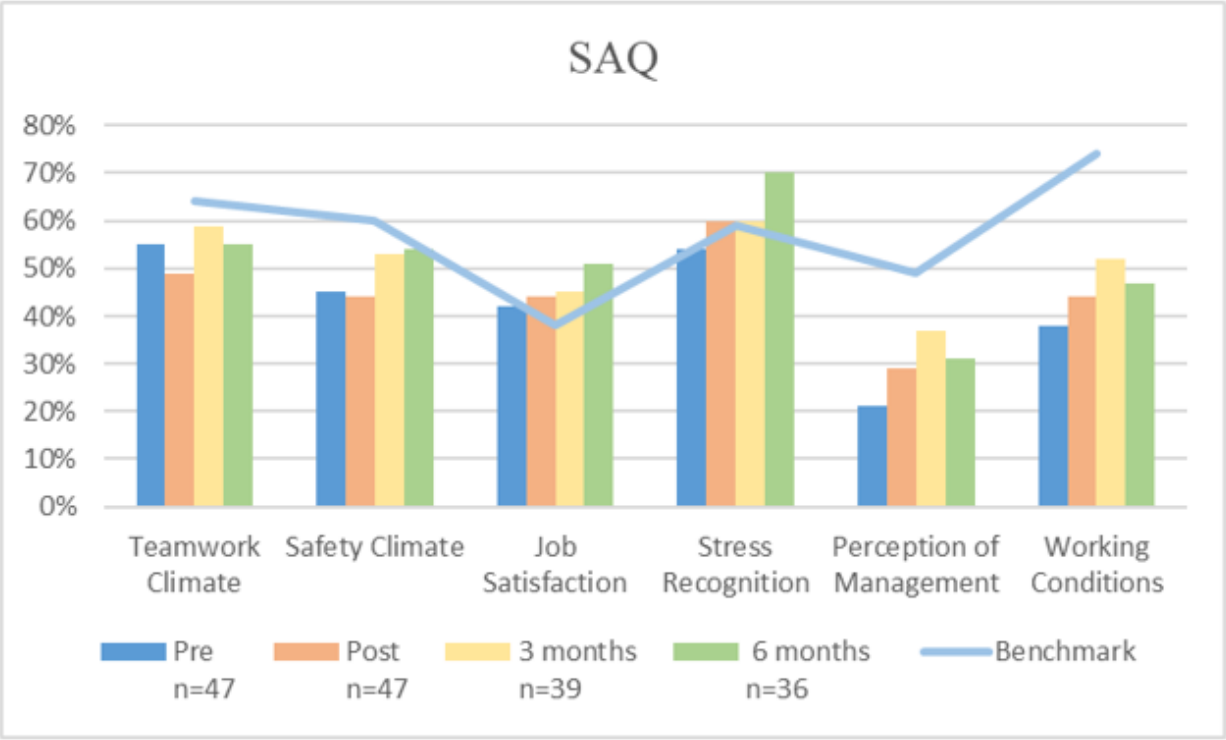
Appendix X

Safety Attitude Questionnaire (SAQ) Results

(Mean percent positive scores "Agree" and "Strongly Agree" responses on the survey's five-point Likert scale)

SAQ category	Pre *n*=47	Post *n*=47	3 months *n*=39	6 months *n*=36	Benchmark
Teamwork Climate	55%	49%	59%	55%	64%
Safety Climate	45%	44%	53%	54%	60%
Job Satisfaction	42%	44%	45%	51%	38%
Stress Recognition	54%	60%	60%	70%	59%
Perception of Management	21%	29%	37%	31%	49%
Working Conditions	38%	44%	52%	47%	74%

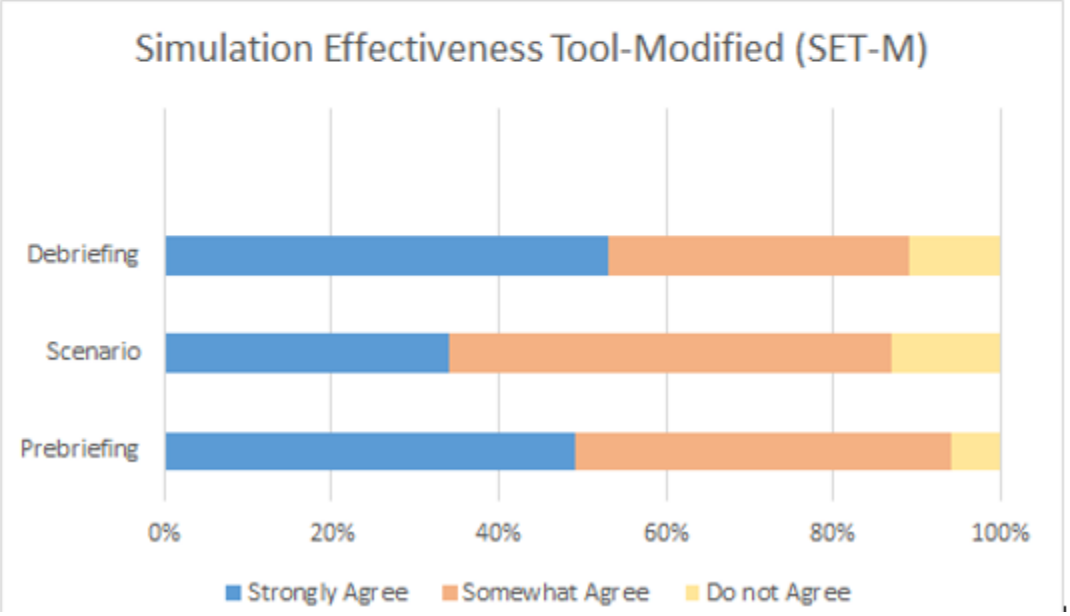
Safety Attitude Questionnaire (SAQ) Results with Benchmark (literature)



Appendix Y

Simulation Effectiveness Tool-Modified (SET-M) Results

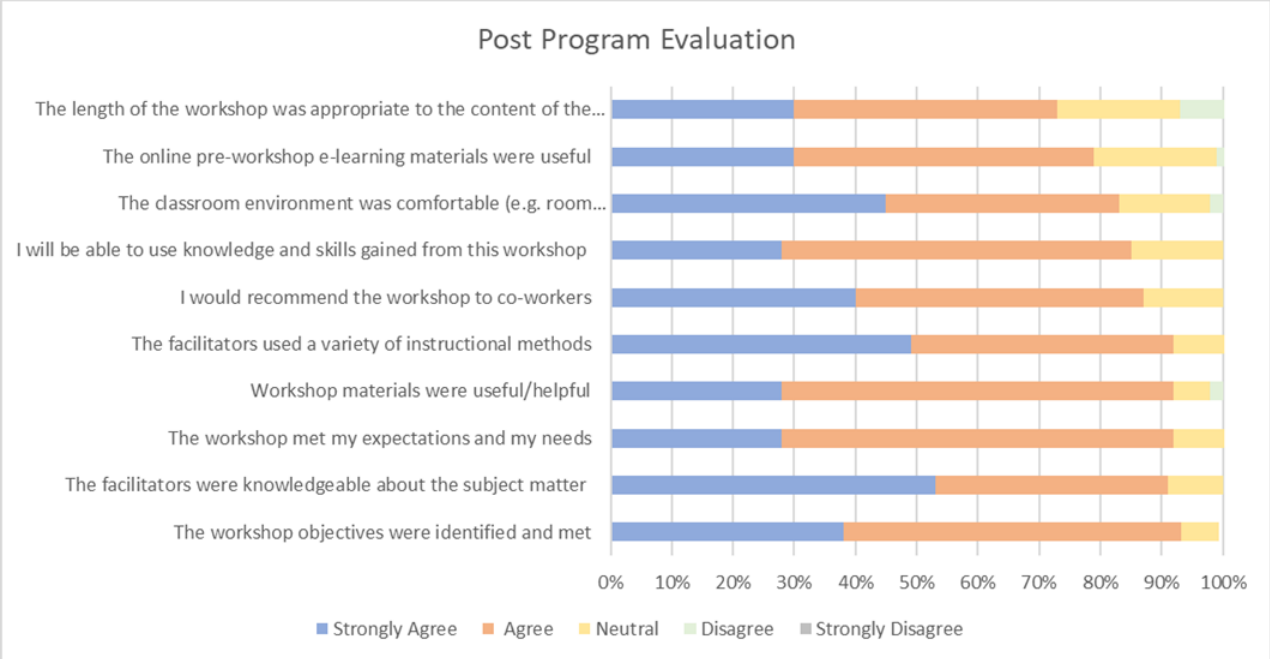
	Strongly Agree	Somewhat Agree	Do not Agree
Prebriefing	23 (49%)	21 (45%)	3 (6%)
Scenario	16 (34%)	25 (53%)	6 (13%)
Debriefing	25 (53%)	17 (36%)	5 (11%)



Appendix Z

Immediate Post Program Evaluation Results

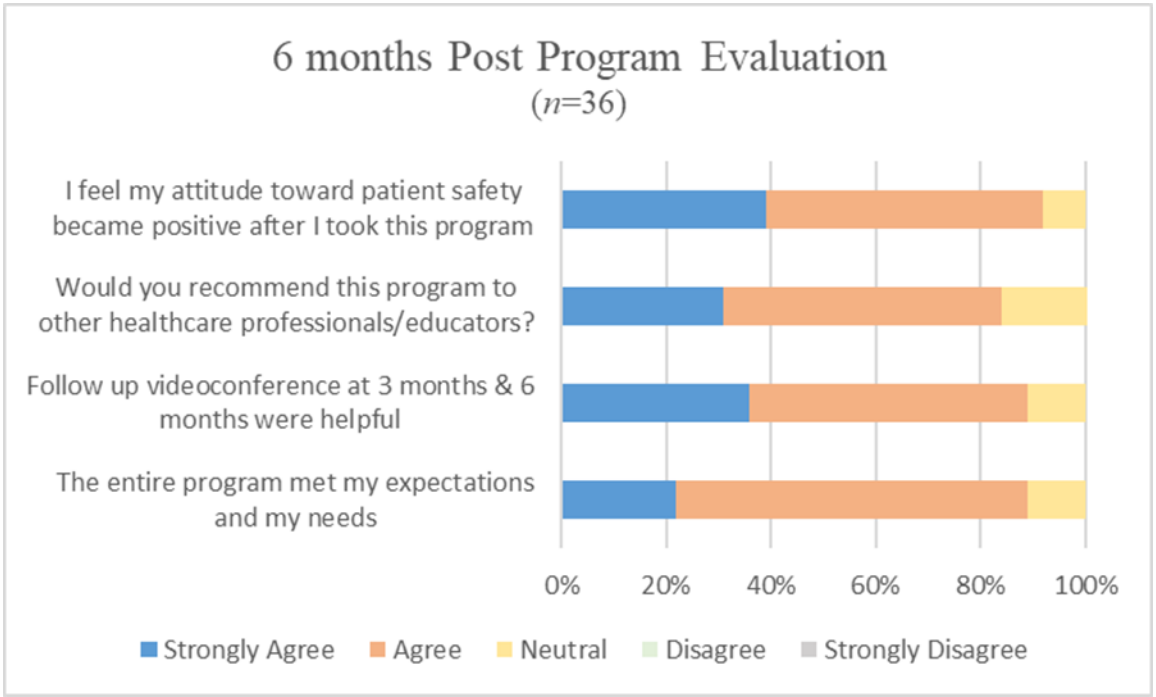
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The workshop objectives were identified and met	18 (38.3%)	26 (55.3%)	3 (6.4%)	0 (0%)	0 (0%)
The facilitators were knowledgeable about the subject matter	25 (53.2%)	18 (38.3%)	4 (8.5%)	0 (0%)	0 (0%)
The workshop met my expectations and my needs	13 (27.7%)	30 (63.8%)	4 (8.5%)	0 (0%)	0 (0%)
Workshop materials were useful/helpful	13 (27.7%)	30 (63.8%)	3 (6.4%)	1 (2.1%)	0 (0%)
The facilitators used a variety of instructional methods	23 (48.9%)	20 (42.6%)	4 (8.5%)	0 (0%)	0 (0%)
I would recommend the workshop to co-workers	19 (40.4%)	22 (46.8%)	6 (12.8%)	0 (0%)	0 (0%)
I will be able to use knowledge and skills gained from this workshop	13 (27.7%)	27 (57.4%)	7 (14.9%)	0 (0%)	0 (0%)
The classroom environment was comfortable (e.g. room temperature, seating)	21 (44.7%)	18 (38.3%)	7 (14.9%)	1 (2.1%)	0 (0%)
The online pre-workshop e-learning materials were useful	14 (29.8%)	23 (49%)	9 (19.1%)	1 (2.1%)	0 (0%)
The length of the workshop was appropriate to the content of the training	14 (29.8%)	20 (42.6%)	9 (19.1%)	4 (8.5%)	0 (0%)



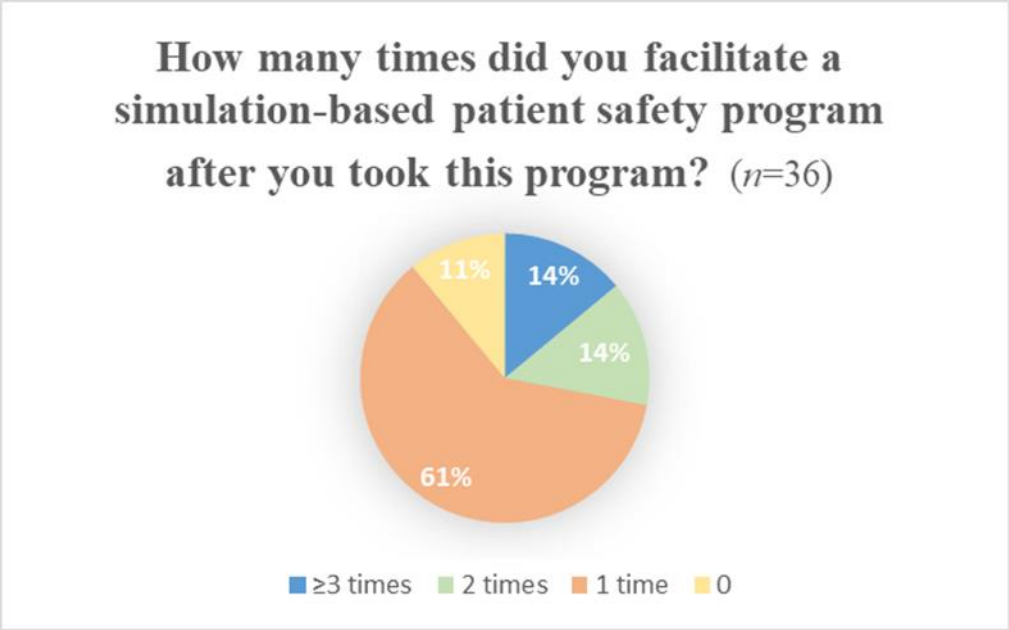
Appendix AA

6 Months Post Program Evaluation

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The entire program met my expectations and my needs	8 (22%)	24 (67%)	4 (11%)	0%	0%
Follow up videoconference at 3 months & 6 months were helpful	13 (36%)	19 (53%)	4 (11%)	0%	0%
Would you recommend this program to other healthcare professionals/educators?	11 (31%)	19 (53%)	6 (17%)	0%	0%
I feel my attitude toward patient safety became positive after I took this program	14 (39%)	19 (53%)	3 (8%)	0%	0%



	≥3 times	2 times	1 time	0
How many times did you facilitate a simulation-based patient safety program after you took this program?	5 (14%)	5 (14%)	21 (61%)	4 (11%)



Appendix BB

6 Steps Program Development Template

Patient Safety

Program Development Template

Step 1: Identify Problem

- Identify a patient safety problem that will be addressed by your program

Current approach	Your approach	Ideal approach

Step2: Needs Assessment

- Targeted learner (e.g. 1st year resident/nurse)
- Previous training and experience regarding the safety topic (knowledge, skills and attitude)
- Preference/expected learning methods (lecture, online, group, simulation etc)
- Learning time (weekends, before/after shift etc)
- Needs assessment methods (group discussion, questionnaires, tests, current performance etc)

- Barriers and factors that affect learning by the targeted learners (clinical experience, time)

Step 3: Goals & Objectives

Goal:

Learner Objectives: **S**pecific **M**easurable **A**chievable **R**ealistic **T**ime limited

- Who Will do How much of What by When

Knowledge

Skill/performance

Behavior/attitude

Step 4: Instructional Strategies

	Objectives	Educational methods
Knowledge		
Skill/Performance		
Attitudes		

Step 5: Implementation

1) Resources
   - Faculty & Staff (how many and what kind of personnel support you need)
   - Time
   - Facilities (Space, equipment, clinical sites)
   - Funding/costs

2) Support
   - Internal (hospital administration, department chair etc)
   - External (accreditation bodies, government etc)

3) Operation
   - Program preparation, scheduling, program announcement, program materials, program revisions

4) Barriers
   - Financial or other resources
   - People (lack of support, attitudes)
   - Others

5) Plan
   - Implementing date, time & location

Step 6: Evaluation and Feedback

	Evaluation method	Evaluation design (Pre/post)
Individual Participant (Formative/Summative)		
Program **Identify/suggest for improvement**		